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Improved Broom-handle Lathe.

The machine herewith illustrated is one of a large class of ingenious wood-working tools for which our mechanics have obtained a world-wide celebrity. The details and operation of the machine will be readily understood by referring to the letters affixed to the several parts. The iron frame, A, carries the counter-shaft and the pulleys thereon, from which the motion is transmitted to the cutters above. The shaft, *a a*, are provided with the grooved rollers, *b*; these seize the stuff to be turned, when placed on the table, *c*, and presented to them; there are similar ones on the other end, driven by the same spur wheel that operates the first-mentioned feed roller. There are also spur wheels on the roller shafts inside of the bearing, one of which may be seen at *d* engaging with the wheel, *e*. The bevel gear, *f*, and pinion drives the shaft on the side of the frame; it is provided with a head containing cutters, for the purpose of rounding the ends of the handles when finished.

Fig. 1.

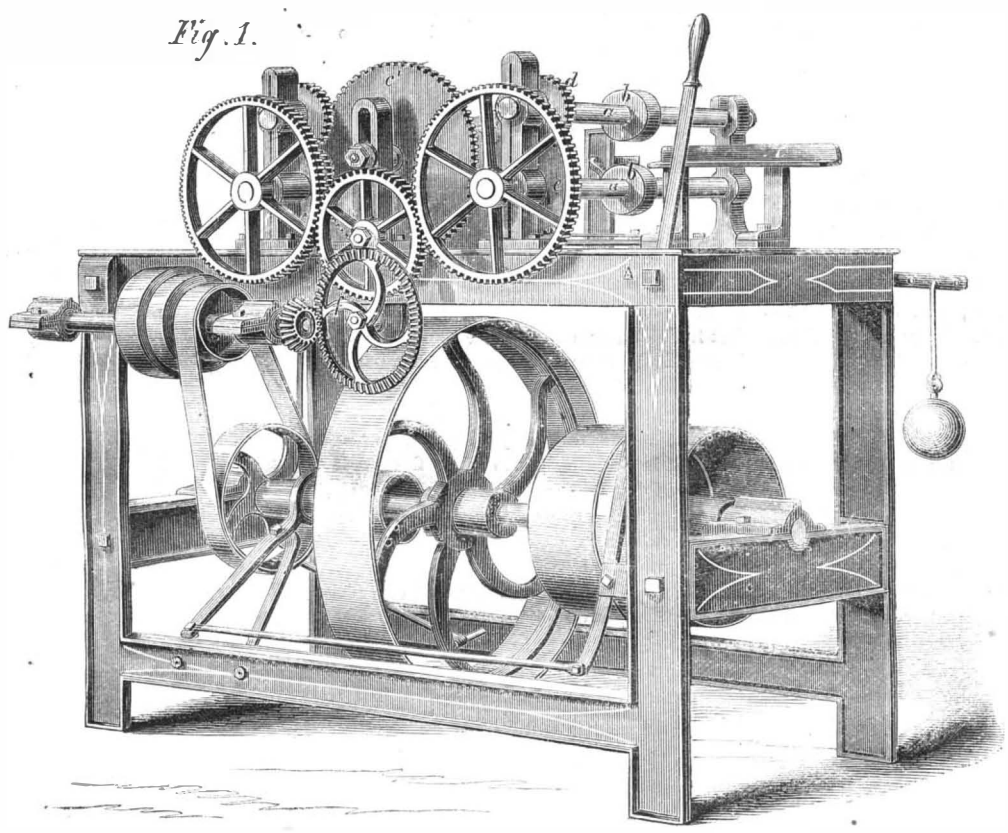
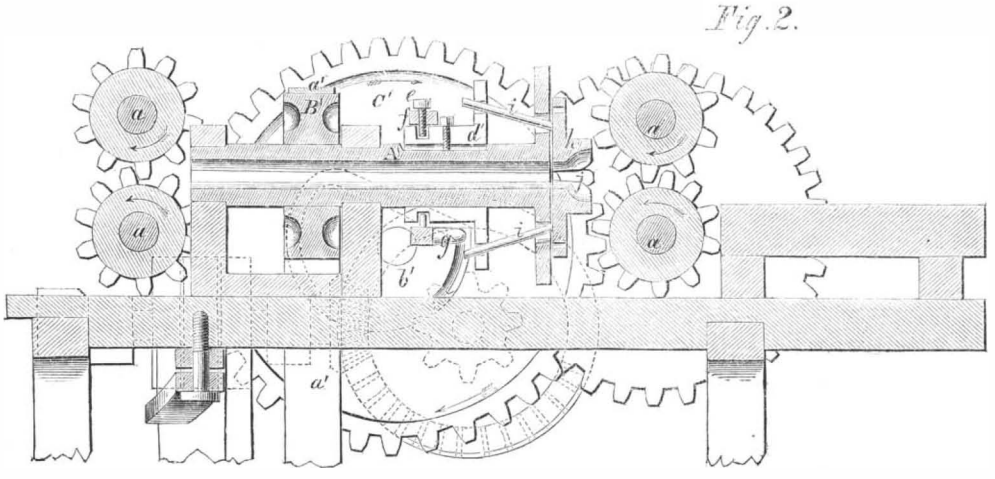


Fig. 2.



PRESCOTT'S PATENT BROOM-HANDLE LATHE.

Fig. 2 is a section of the machine, and shows very clearly the cutting apparatus. The hollow spindle, A′, is driven by the belt, *a′*, on the pulley, B′. The feed shafts, *a a*, are shown in section, and revolve in the direction indicated by the arrows. The cam groove, *b′*, is cast in the wheel, *c′*, and works the sliding collar, *d*, this collar has an annular groove in its periphery into which a pin, *e*, works; this pin is set in the short arm of the forked lever, *f*, pivoted to the table. The long arm, *g*, of this lever projects under the spindle, and passes into the cam groove in the side of the spur wheel; the sliding collar, *d*, will therefore receive its motion on the hollow spindle, from the groove in the spur wheel through the agency of the lever. The knife block, *h*, is secured to the outside of the flange in the spindle, and as the sliding collar moves back and forth on the hollow spindle, by the lever working in the cam, the blocks open and shut through the means of the pins, *i*. The cutters, *j*, in the blocks have beveled knife edges, which cut away the wood and round the stick as fast as it is fed in by the rollers. These are the main features of this lathe. The operation is as follows:—

When the power is communicated by shifting the belt, through the medium of the levers, the spur wheels, shafts, feed rollers and cutters revolve with great velocity. The wood is then fed in by the table to the rollers, and passed into the hollow mandrel. Here the knives reduce it to shape, the taper being given by the cam and sliding collar. The ends of the handle are then rounded by a cutterhead on the shaft at the side, and the process is then complete. The details of this machine are well contrived, and it would seem to be a very efficient tool. Patented through the Scientific American Patent Agency, Oct. 8, 1861, by Peter Prescott, of Boonville, N. Y., of whom further information regarding the purchase of rights or machines may be had.

MILLING AND THE DRESS OF STONES.

We have recently published quite a number of communications from practical millers, on the dressing of stones and the grinding of grain. These have been furnished by persons residing in almost every section of the country; and some of them have stated that they had been engaged in the milling business for many years. In comparing these communications they are found to leave the subject in a very confused state. One correspondent is in favor of a straight dress on the stones; another in favor of a circular dress. One approves of deep channels at the skirt; another advocates shallow channels. The subject has been presented in various phases, and many different opinions have been expressed upon it; and from such evidence we judge that various modes of milling are practiced, but we have not been able to learn which is the best.

We have a few suggestions to make to millers, which, if acted upon, we think will not be unprofitable in leading to more correct ideas on such important questions. In a mill, for example, where several runs of stones are employed, let two pairs of the same size and quality be set apart for experiments. Let these be tested together with different dresses in grinding the same quality of grain, and a correct record kept of their performances, say for three months. In this manner the merits of the different dresses will be fairly tested. In two mills where the stones are run at different speeds, and where they may be employed upon grain of different qualities, no fair comparison can be instituted.

A FIRST cargo of silk from Japan arrived at Lyons, France, last month. It reached Europe, not by the Chinese seas and India, but by the Pacific and the Isthmus of Panama. The silk crossed the Isthmus by railway, and was again embarked on the Atlantic.

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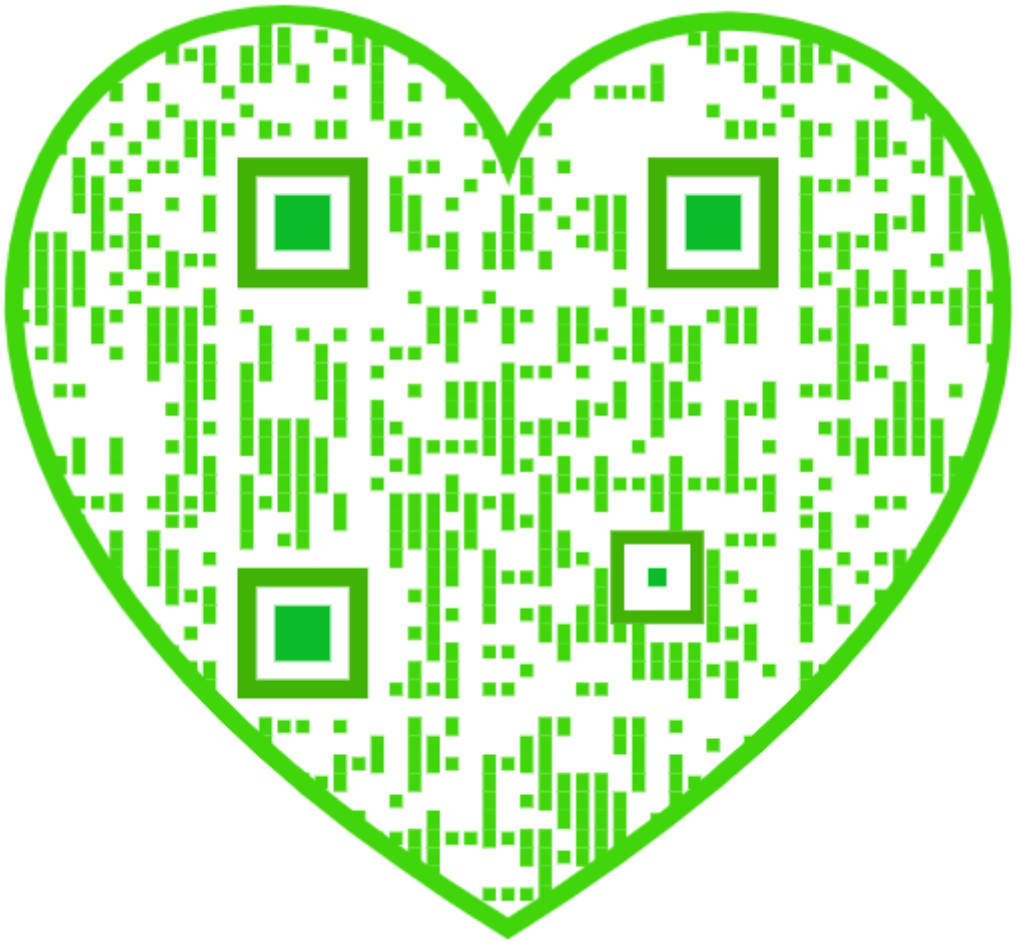

THE "DUNDERBERG."

The formidable ram-frigate, *Dunderberg*, now building for the Government by W. H. Webb, at his yard at the foot of Sixth street, this city, is in a very forward state, and being completed as fast as possible. We lately visited this vessel, and are able to furnish a few details of her construction which we think will prove acceptable to our readers.

THE HULL.

The hull of the *Dunderberg* is massive, being solid from stem to stern; it is 378 feet long, 68 feet wide and 32 feet deep. The frames are twelve inches thick, and are built of oak, firmly bolted and fastened together. The model of the ship is very peculiar. The floor is dead flat for the whole length, and the sides rise from it at an angle every where save forward, where they are very nearly vertical. The bow is as sharp and has as fine lines as it is possible to give it, and the stern and run aft are very clean and handsomely modeled. The hull is divided by several water-tight compartments, both longitudinally and transversely—a precaution, common to nearly all modern sea-going ships, which has been found indispensable. The frames are strapped diagonally with heavy irons, 5 inches wide by $\frac{7}{8}$ of an inch thick, blunt bolted to them. There is a slight sheer on deck, but it is almost invisible to the casual observer at a short distance. There is but one rudder, provision is made, however, for steering by an auxiliary apparatus of a peculiar nature, should the main steering gear be shot away. The frame timbers, 12 inches thick, are ceiled inside 5 inches thick, planked outside 5 inches thick, and over the planking two courses of heavy oak beams, 12 inches thick, are again laid, making in all an aggregate amount of nearly five feet of solid timber on the ram's sides. The planking is all caulked, and the seams payed before the last protection is applied, and the entire mass is as firmly bolted together as it is possible to do it.

THE RAM.

The ram on the *Dunderberg* is about as formidable a looking object as one can conceive; the entire forefoot of the vessel is prolonged thirty feet from the hull proper, and, rising easily upward from the keel about half the distance from the water line, is there rounded, presenting a blunt end in shape like the profile of an axe edge; it then runs back toward the stem again. The mass of wood which forms this ram projects inside of the hull almost as far as it does outboard, and is there substantially secured to the main timbers. The sides and edge of the ram will be iron-plated, and even should the whole of it be knocked off in an affray the builders say that the hull will be water-tight.

THE CASEMATE.

The *Dunderberg* has, on top of the main deck, casemated quarters for the guns and crew. This casemate slopes at an acute angle from the sides to the top; it takes up a large portion of the vessel amidships, and is an elongated octagon in shape; it is made of heavy timber plated with iron 4½ inches thick; it is pierced on each side for three broadside guns, and has one port forward and another aft in the casemate, for bow and stern firing. The hull of the ship is built out from a distance below the water-line to meet the edge of the casemate above, so that the broadside of the *Dunderberg* will present an acute angle to the line of the enemies fire. We do not know what the inclination of the casemate and side is, but it cannot be less than 45°. The mass of wood and iron presenting a resistance to the enemy's rams or projectiles at this point amounts in all to seven feet. There are to be two turrets on the top of this casemate. The thickness of the turret walls will be much greater than those of the "Monitor" batteries, and strong enough to resist the heaviest ordnance. The armament of the *Dunderberg* has been variously-guessed at by parties; as it is not publicly known what it will be, we are not able to inform our readers further than that rumor assigns the 20 inch guns to the broadside, while each turret will also contain two heavy guns. The deck of the casemate, and also the main deck, will be plated bombproof, and the quarters for the officers and crew, being in the fortress on deck, will be thoroughly ventilated and open to the light and air; there will then be none of that depressing influence which is so marked in the departments assigned to the crews on the other batteries.

One great and overwhelming advantage that this splendid vessel has is that she is built of wood. She may leak, become waterlogged, roll, pitch and toss, but there will still be some hope for the crew as long as they stick to her. Iron batteries fill and plunge out of sight with very little warning. The effect of this fact upon sailors morally is not the least important one; although no men could have behaved better than the crew of the *Monitor* did in their peril, yet they all felt that their case was hopeless, and if they were saved it would be more the result of good fortune than any aid which their ship could afford them. The *Dunderberg* will draw about twenty feet of water. Her speed is not stated. Her engines are estimated at 6,000 horse-power. We are not able at present to give particulars of them.

Illinois Coal Mines.

The following interesting extracts are from the Chicago *Commercial Advertiser*:—

"It is generally known to the people of the West that along the line of the Chicago and Alton Railroad there exist several extensive and prolific coal mines, yielding annually immense quantities of bituminous coal, of a fair quality, and which go far toward supplying the railroads, machine shops, manufactories, &c., of Illinois, with cheap and convenient fuel. The oldest, and, so far as is known, the most extensive of these beds are located six miles below Alton, and three miles east of the Mississippi river; they are also stretched along the banks of a small stream known as Wood river, from which circumstance they bear the name of 'Wood River Mines.' These beds or measures were discovered about twelve years ago, and have since been owned and worked by the 'Wood River Coal Company,' of which C. Francis is the superintendent. The vein is six feet in thickness, and fifty feet below the surface. It is worked by steam power. The company have constructed a railroad from the mines to the bank of the Mississippi. Over this track the coal is conveyed in suitable cars, drawn by a locomotive, to the river, where it is 'dumped' into large flat boats. These are towed down to St. Louis, by steamboats, the coal being generally transferred from the scows to the steamers during the trip down. Immense quantities of coal from these mines are used by Mississippi boats, and also by various manufacturing establishments in St. Louis.

"The coal mines owned and worked by the 'Madison Coal Company' are located under a ridge, crossed by the Chicago and Alton Railroad. They have been worked successfully and profitably for about ten years. Thomas Dunford, who resides near Alton, is superintendent of the mining operations here. Fifteen or twenty shafts have been sunk, which are worked by horse power, and which, when supplied with a full complement of 'hands,' yield about eight car loads of coal per day. The principal vein lies eighty feet down, and presents an average thickness of thirty inches. This coal is shipped both North and South. It is used extensively in St. Louis, and at all points on the Chicago and Alton Railroad as far north as Springfield. The railroad company use the Alton coal and find it adapted to their purposes.

"At a point called Braceville, six miles south of Wilmington, in Will county, a splendid vein of coal was discovered about a year ago, though it is only seven months since it began to be worked to any considerable extent. This vein is the property of Charles Boyer, Esq., senator from Will county. Mr. Boyer is now working his valuable mine with steam power, and gets out an average yield of eighty tuns per diem. The vein lies within fifty feet of the track of the Alton and St. Louis Railroad. It is one hundred feet down, at Braceville, running deeper south of that point and nearer the surface north of it. Its greatest thickness, so far as measurements have shown, is four feet. The quality of this coal is good, being quite similar, in all essential features, to that produced by the Alton mines.

"Within a few weeks past, the city authorities of Bloomington have appropriated one thousand dollars to the purpose of boring for coal, at a spot west of the city and a short distance from the Chicago and Alton Railroad."

THERE are 59,000 branches of holly and 56,500 of misletoe sold yearly at Christmas in London.

THE PNEUMATIC POST IN OPERATION.

We learn from the London *Mechanics' Magazine*, of February 6th, that the Pneumatic Post, illustrated on page 209, Vol. V. (new series) of the SCIENTIFIC AMERICAN, is now in operation transmitting the mails between one of the railroad stations and a branch post-office in London. Our cotemporary says:—"The mail bags, upwards of 120 per day, will be blown through the tube in 55 seconds to the post office, Eversholt street; the usual time occupied by the mail carts being about 10 minutes." The Pneumatic Despatch Company are also about to lay down tubes for connecting the markets of London with one of the great railroad stations and with the General Post-office. It is expected that the operations of this company will ultimately in a great measure tend to revolutionize the carrying system in London, and relieve the crowded state of its principal streets.

Canadian Petroleum.

In 1862 seventeen vessels loaded with Canadian petroleum cleared for Europe through the St. Lawrence; total capacity 15,016 tuns, and containing some 35,000 barrels or 1,279,000 gallons. With respect to the future supply of Canadian petroleum the Toronto *Globe* says:—"The stoppage of several of the largest flowing wells indicated, it was feared, an exhaustion of the sources of the oil. When it was found, however, that even more than the usual response was made to the vigorous pumping operations thus induced, the suspense was succeeded by a very general feeling of relief, not only because a good supply was forthcoming, but also that a large number of persons interested in the pumping wells would reap the benefit of their investment. Indeed the 'indications' in the oil regions of Canada are every day more apparent, covering an immense area of country, and promising an abundant return for the investment of apital. In the vicinity of Oil Springs there are over 100 wells, twenty-five of which are in constant operation. The present yield of crude oil in Canada oes not fall short of 300 barrels per day, which can be almost indefinitely increased."

An Engine for the "Mosquito" Fleet.

The Portland (Me.) *Advertiser* editor has seen a miniature steam engine made by a genius in New York. It is on the low pressure principle, the total length being six inches, the boiler three inches long and one and a quarter in diameter, all being made of brass except the driving and piston rods, which are of steel. It can be put in motion with the aid of the single flame of a small spirit lamp and works as perfectly in every particular as any engine of large capacity. It is about "50-mosquito power." This is not at all diminutive as compared with one exhibited at the steam fire-engine trial at Troy, in 1860; this was a model of Lee & Larned's engine, in which the steam cylinder was only half an inch bore and three-quarters of an inch stroke; it had a feed pump which might have been put into a thimble. This was a working model and threw a ponderous volume of water, of the size of a pin, about five feet. The whole affair, boiler, truck and carriage, with everything in working order, weighed two pounds and a half.

TUNS OF BULLETS.—The army of the United States used, during the year 1862, sixteen thousand tuns of bullets. By an improvement in elongated bullets made by E. D. Williams, recently adopted and gradually being brought into the service, such a reduction in the weight is effected that it is calculated a saving of six million dollars a year will be made in the expense of metal and of transportation. It will save to the army of the Potomac alone two hundred ammunition wagons.

THE astronomers and other savans of London are getting up another big telescope, of far greater dimensions than Lord Ross's famous six-foot reflector. It is thought that with the new instrument a vigilant observer may easily converse with "the man in the moon," and in that manner to be able to solve many interesting and yet mysterious problems.

COTTON (middling American) has been selling for ninety and ninety-one cents per pound, last week, in New York.

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MISCELLANEOUS SUMMARY.

In the drainage of the Cornish mines the economy of fuel is much attended to. A bushel of coals usually raises forty thousand tuns of water a foot high; but it has on some occasions raised sixty thousand tuns the same height. Let us take its labor at fifty thousand tuns raised one foot high. A horse worked in a fast stage-coach pulls against an average resistance of about a quarter of a hundred weight. Against this he is able to work at the usual speed through about eight miles daily; his work is therefore equivalent to about five hundred tuns raised one foot. A bushel of coals, consequently, as used in Cornwall, performs as much labor as a day's work of one hundred such horses.

A pint of water may be evaporated by two ounces of coals. In its evaporation it swells into two hundred and sixteen gallons of steam, with a mechanical force sufficient to raise a weight of thirty-seven tuns a foot high. The steam thus produced has a pressure equal to that of common atmospheric air; and by allowing it to expand, by virtue of its elasticity, a further mechanical force may be obtained, at least equal in amount to the former. A pint of water, therefore, and two ounces of common coal, are thus rendered capable of doing as much work as is equivalent to seventy-four tuns raised a foot high.

The great pyramid of Egypt stands upon a base measuring seven hundred feet each way, and is five hundred feet high, it weight being twelve thousand seven hundred and sixty millions of pounds. Herodotus states that, in constructing it, one hundred thousand men were constantly employed for twenty years. The materials of this pyramid could be raised from the ground to their present position by the combustion of about four hundred and eighty tuns of coals.

A pound of coke burned in a locomotive engine will evaporate about five pints of water. In their evaporation they will exert a mechanical force sufficient to draw two tuns weight on the railway a distance of one mile in two minutes. Four horses working in a stage-coach on a common road are necessary to draw the same weight the same distance in six minutes.

The circumference of the earth measures twenty-five thousand miles; and if it were begirt with an iron railway, such a train as above described, carrying two hundred and forty passengers, could be drawn round it by the combustion of about thirty tuns of coke, and the circuit could be accomplished in five weeks.

Mr. Oliver Leslie, of Attica, Ind., has called at our office and shown us a plan of a novel battery, which he has designed for destroying ships of war. We are prohibited from disclosing any of the details of its construction, but from the projection of it shown, it seems to be a very destructive-looking concern. Most of the principles embraced in its construction are sound, and we can add sincerely that we should like very much to see it tried.

Grog.—Mixed liquors are called "grog" because Admiral Vernon, who was the first to mix his sailors' allowance with water, was nicknamed "Old Grog" from his wearing a *grogram* coat; and this name (grog) was given to the adulterated liquor he compelled the seamen of the fleet to drink.

One quart of wheat flour weighs 1 lb. avoirdupois; one quart of Indian meal, 1 lb. 2 oz.; one quart of soft butter, 1 lb. 1 oz.; one quart of lump sugar, 1 lb.; one quart of white powdered sugar, 1 lb. 1 oz.; one quart of best brown sugar, 1 lb. 2 oz.; 10 eggs, average size, weigh 1 lb.

From late English papers we learn that there were 180,000 bales of cotton on their way from India to Liverpool, in the last week of January, and 6,000 bales had arrived in that week from Egypt.

Over 1,000 tuns of iron ore were thrown out at a single blast at the Lake Superior mines, on the 19th of January. The Marquette *News* says it is intended to fire a still larger blast on the Fourth of July next, as a national salute.

It is estimated that it costs $20 a tun for transportation of merchandise per one hundred miles on an ordinary road; $2 on a railroad and 20 cents on the ocean, for the same distance.

Ship-building in Philadelphia.—Messrs. Cramp & Sons have recently launched four propellers, one 225 feet long, 32 feet beam and of 1,000 tuns burden; two of 175 feet length, 30 feet beam and 19 feet hold; burden, 600 tuns each; and a tugboat of 300 tuns, the dimensions being—length, 120 feet; breadth of beam, 28 feet; depth of hold, 11 feet. The above firm has now five vessels on the stocks. One of these is a Government side-wheel steamer, which, it is expected, will be completed in about four weeks. She is 240 feet long, 34 feet beam and of 1,200 tuns burden At Neaffie & Levy's, machinery is being constructed for some forty different steamers. An iron steamer, 240 feet long, 34 feet beam, 22 feet hold and of 1,800 tuns burden, is being completed and will be ready for launcing about the middle of this month. At this yard there are between five and six hundred men employed.

The Demand for Labor in Pittsburgh.—The scarcity of rolling mill hands, &c., is severely felt by Pittsburgh manufacturers, and steps are being taken to secure a supply from England. Two of the heaviest manufacturers in the above city left for England last week, for the purpose of bringing out hands of this character. They will bring out altogether some two hundred, and at the present high rate of wages in Pittsburgh they will have no difficulty in getting all they want.

Those who profess to know say that the warm Gulf Stream is gradually drawing nearer our coast, moderating our winter weather. The sharks which have frequented our coast for the last two summers and the mildness of the winters for the past two years are considered proofs of this fact.

Worth of a Paper Dollar.—When men read of gold being at 170, they naturally conclude that a paper dollar is worth but 30 cents; but the 30 cents in gold, at 70 per cent premium, is worth but 51 cents in paper, so that paper is worth about 60 cents on the dollar when gold is quoted at 170.

Lake Village, N. H., has three large hosiery establishments, turning out about five hundred dozen pairs daily. A large Government contract has just been completed. The place also has two sawmills, turning out 30,000 feet of lumber per day; a large machine-shop, with box factories and planing mills to match.

Laconia, N. H., has four hosiery mills, making 600 dozen pairs of hose daily, beside a large quantity of ladies' sontags, hoods, &c., and some very fine cassimeres. There is also a shoe-peg mill which produces daily 250 barrels of shoe-pegs, which are sent to Boston.

Cutting Timber.

The following information about cutting timber has been forwarded to us from a correspondent, who states he found it among the manuscripts of a deceased friend. It appears to be practical, and deserving of general attention:—

"Tradition says that the 'old' of the moon in February is the best time to cut timber; but from more than twenty years of observation and actual experience, I am fully convinced that it is about the worst time to cut most if not all kinds of hard wood timber. Birch, ash, and most or all kinds of hard wood will invariably *powder-post* if cut any time in the fall after the tree is frozen, or before it is thoroughly leaved out in the spring of the year. But if cut after the sap in the tree is used up in the growth of the tree, until freezing weather again comes, it will in no instance produce the powder-post worm. When the tree is frozen and cut in this condition, the worm first commences its ravages on the inside film of the bark, and then penetrates the wood until it destroys the sap part thereof. I have found the months of August, September and October to be the three best in the year to cut hard-wood timber. If cut in these months the timber is harder, more elastic and durable than if cut in winter months. I have, by weighing timber, found that of equal quality got out for joiners' tools, is much heavier when cut and got out in the above-named months than in the winter and spring months, and it is not so liable to crack. You may cut a tree in September, and another in the 'old' of the moon in February following, and let them remain, and in one year from the cutting of the first tree you will find it sound and unhurt, while the one last cut is scarcely fit for firewood, from decay. This I know by experience. I know of several buildings the frames of which were cut in the 'old' of the moon in February, principally of beach timber, now literally eaten up by the powder-post worm; while other timber, cut before the frost came, remains perfectly sound, without the least mark of a worm. Chestnut timber for building will last longest, provided the bark be taken off. Hemlock and pine ought to be cut before being hard frozen, although they do not powder-post; yet if they are cut in the middle of the winter or in the spring of the year, and the bark is not taken off, the grub will immediately commence its ravages between the bark and the wood. I have walnut timber on hand which has been cut from one to ten years, with the bark on, which was designed for ax-helves and ox-bows, and not a worm is to be found therein; it was cut between the first of August and the first of November. I have other pieces of the same timber cut in the winter months, not two years old, and they are entirely destroyed, being full of powder-post and grub worms. Within the last ten or twelve years I have stated the result of my observation on, and experience of, cutting timber in different seasons of the year, to many of my neighbors and others; and all who have made the trial are satisfied that the above statement is correct. Others more incredulous follow traditions. It is a fact which is beyond contradiction that when there is the least sap in timber it is the most durable and solid, and will, when seasoned, be the heaviest. And I am fully persuaded that nine cords of wood cut in those months above-named, will go further than ten cut in the winter months. It will burn clearer, the coals will be more solid, and they will retain their heat double the length of time. Who does not know that wood cut in the winter and suffered to remain in the log, or exposed to the weather, is of but little value? especially beach, birch, maple, &c; being so far decayed it rather molders away than burns, making no coals and giving little heat. Hoop poles ought to be cut before frost comes, and they will last three times as long as when cut in the winter, and will remain free from worms. The late Mr. Leonard Kennedy, of Hartford, Conn., stated to me some twelve years since that he had lost more or less walnut timber yearly, which he was in the habit of purchasing for screws, printing presses, vices, &c., by its powder-posting, although he had been particular to have it cut as far as possible in the 'old' of the moon in February, and he inquired of me if I could inform him how to prevent it. I told him to order his timber cut in August and September, instead of February. He afterward told me that the advice was of much value to him as he had lost none since, if cut in those months; and that he thought the screws were better. Many others might be named who have followed the same advice, and none have failed of success. Most if not all persons are more or less interested in the above, either in building-timber or mechanical business; and on a fair trial they will find they have not been deceived by me."

The Earth is Safe.

The London *Times* says mankind are using up the world too fast. Incessant cultivation, it is alleged, is stripping the earth of its coat of mold, which cannot be replaced except by a return to the primeval forest. There are facts in existence a little inconsistent with that alarming statement. The plain around Benares has certainly been cultured for three thousand years, and is as rich as ever. The country around Damascus was a garden in the beginning of history and is a garden now. No forest ever renewed the soil of Northern Italy, nor is the glorious fertility of Asia Minor artificial. Districts have, it is true, perished, but it has always been from human folly, the cutting-down of the trees till the rain ceased and the wells sank, as is now occurring in some parts of Upper India. When we conquered the Punjaub that vast province did not contain one tree, and in thirty years would have become like the Babylonian desert, a sterile plain, and from the same cause.—*London Spectator.*

Cobalt.—The word "cobalt" is derived from the German *kobold*—"a devil;" this term was applied to that metal by the German miners, who considered its presence unfavorable to the existence of more important metals.

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THE SOURCES OF SPRINGS AND RIVERS.

BY JAMES B. TIBBITS.

In our observations in mountains and hilly regions, and not unfrequently in level positions of country, we find small streams of water issuing from the earth, and after passing alone over a certain portion of country uniting with each other and forming large streams, which, again uniting with others still larger, form our largest rivers. In traveling over many parts of our own country, especially the broken parts of New York, Illinois, Wisconsin and Iowa, we find many excellent and never-failing springs; some of which discharge several hogsheads of water a minute and are apparently never affected by heavy rains or long-continued drought. Some issue from the foot of a hill or bluff, others pour their waters from its rocky sides, while yet others are found nearly or quite on a level with the summit itself; the waters of each finally uniting in the great body of the Mississippi. Not only in this but in nearly all countries of the earth, the same process of nature is continually going on, and all the known large streams of water on the globe have run their lengthened course from the earliest period of the world's history to the present time.

Now the question is, whence do rivers receive so constant a supply of water? Various answers and theories have been advanced in the explanation of this singular phenomena. Some on seeing a spring issue from the side of a hill suppose that it must have a fountain-head still higher than itself. This doubtless is often the case, but we sometimes find springs on the tops of hills and mountains which are higher than any of the surrounding country. Others say that the principle of the siphon enable us to account for springs which are sometimes found on the tops of mountains; but this cannot be, for the principle of the siphon requires a fountain-head higher than the point of discharge, however high or low the water may be carried between that fountain-head and that point of discharge. Others say that the question is satisfactorily solved by a consideration of the effects of evaporation. By the heat of the sun the particles of water are drawn up into the atmosphere from the surface of the ocean and float in the air in the form of clouds or vapors. These vapors are carried by the wind over the surface of the land, and are again condensed into water on the tops and sides of mountains, and, gliding down into their crevices and caverns, at length break out into springs, several of which meeting in one common valley become a river. This is the most popular and perhaps the most satisfactory theory that has yet been advanced.

It is reckoned that on the Eastern continent there are about four hundred and thirty rivers which fall directly into the ocean or into the Mediterranean or Black sea, and on the Western continent about one hundred and forty-five which discharge their waters directly into the ocean. That a vast quantity of this water is furnished to these rivers by the process of evaporation and condensation, we have almost constant proof. But is the supply sufficient for the demand? This is a question that can never be determined with any degree of accuracy. Theory and not practice must be brought into requisition. We will admit that many small streams are nearly, if not wholly, supplied by this means; but such streams during long-continued drought are dried up and entirely disappear, leaving nothing but a dry and sandy bed; while during a heavy fall of rain their waters are swollen and their banks overflown. Larger streams during wet seasons or heavy falls of rain are high and their banks are submerged, but this surplus or surface water, as it might be called, soon runs off and then the river is left at its common size to pour its complement of water into that mighty reservoir which has received the waters of all the earth since time began. That many or most of the larger rivers of the globe would still continue to flow (but in a less than their present size) if the process of evaporation was entirely stopped, there is to my mind not a doubt remaining. Well and truly has the inspired naturalist declared that all the rivers run into the sea, and yet is the sea not full. Unto the place from whence the rivers came thither do they return again. But the question is how do they regain their former source? As much water as is necessary to water and fertilize the earth is raised in the form of vapor and carried by the winds through the atmosphere and is distilled over the earth in the form of dew and rain, and if there is a surplus, which there generally is, it finds its natural channels—the rivers—and is again carried back and again emptied into the ocean. But that portion of water which is the main and reliable source of rivers is carried there through the earth and rises up. Hence those never-failing springs; hence the rush of those mighty waters which we see continually flowing on and on, and never stopping, and yet "the sea is not full." It is a principle of hydrostatics that the surface of all waters which have a communication while they are at rest, will be perfectly level. Now the ocean is the great leveler. That is the unit or starting point from which all calculations as to hight are made. According to the above-named principle, whenever we penetrate the earth to a level with the ocean (except when local causes prevent) we find water. This is abundant proof that all waters beneath the surface of the earth have a communication with the ocean, which fact, I believe, is not disputed or even doubted. Now after these facts are established, I contend that the diurnal motion of the earth or the centrifugal force caused by its daily revolution, aided perhaps by capillary attraction, is sufficient to throw the water to the surface, and thereby cause the prerpetual flow of those streams of water which we see continually issuing from the earth—from the side of the valley to the top of the mountain. How can we for a moment doubt this, when we consider that the surface of the earth in its daily revolution is carried through space at the rate of more than a thousand miles an hour? If the motion of the earth is sufficient to cause those great ocean currents which are known to exist, such as the Gulf Stream, &c., why should we not consider it not only possible but altogether probable that its centrifugal force is sufficient to cause water to issue from various points of its surface, more especially from the sides and tops of mountains or high elevations of land (where the temperature will admit), from the fact that the higher the elevation the greater the space it would pass through in a given time, and consequently the greater the centrifugal force exerted upon that particular point? This theory, I think, is particularly illustrated in the case of the river Nile, which flows for the distance of sixteen hundred miles without receiving the smallest tributary. It is true, that this great river annually overflows the adiacent country, and then settles down within its banks, but it is not reasonable to suppose that from the great excess of rain that falls during that portion of the year, there is enough water left in the mountains to supply it during the remainder of the year, especially when we consider the comparatively small extent of country from which the Nile derives its source. "But" says one, "if your theory be true, the water would everywhere tend to the surface, and the earth instead of being a fit habitation for man, would not only become, but always would have been, a quagmire." Water has its natural channels through the earth as blood has its natural channels through our bodies—destroy the internal arrangement of our bodies and it is not easy to conceive what a deformity man would become; transform the earth into a sponge and its wet surface would become uninhabitable.

A Formula for a Castor-Oil Electuary.

Many persons' stomachs revolt at taking castor oil in an undisguised form. To overcome this repugnance, it has been the practice to administer it in the shape of an emulsion, which involves a large increase in bulk of the dose to be taken, as well as the employment of a considerable quantity of gum or the yolk of an egg, to form the emulsion. To disguise the castor oil, to give it in a condensed form, and to diminish, as much as possible, the quantity of the excipient, the following formula has been devised:—Take of castor oil, 3 ounces; white soft soap, 1 drachm; simple sirup, 1 drachm; oil of cinnamon, 6 drops. Rub the soap with the simple sirup in a mortar, and then add gradually the castor oil, with constant trituration, until it is thoroughly incorporated with the above ingredients. Finally, mix with the electuary thus formed, the oil of cinnamon, or any other essential oil that may be preferred. By these means, a gelatinous electuary will be formed, which is rather palatable than otherwise, and nearly equals, bulk for bulk, castor oil in strength. The quantity of potash present in a dose of this electuary is only a homœopathic dose, and, consequently, not likely to produce a bad result in any case, even when its use should be contra-indicated.—*Septimus Piesse.*

Deodorization of Sewage.

A late number of the London *Journal of Gas-Lighting and Sanitary Improvement* contains a report of Dr. Letheby, on the deodorization of sewage at Northampton, where there is an establishment for the purpose. About 100,000 gallons of drainings from the sewers are received at the works daily. Lime and the chloride of iron are used for defecation; ten bushels of the former and sixty pounds of the latter are used for 100,000 gallons of sewage. The two substances are mixed with water in separate tanks, and the solutions flow over in graduated quantities, into a common discharge pipe, whence they pass into the sewage as it flows from the outfall of the town into the subsiding tanks. Here the solid matter precipitates, and the comparatively clear water runs away by an overflow at the opposite end of the tank, into the outfall-ditch. After working continuously in this manner for about a fortnight or three weeks, the solid matter, in a slushy condition, is drawn up from the bottom of the tanks, and run into prepared pits, where it is mixed with about its own bulk of ashes. This gives consistence to the material, and converts it into a solid compost, which is sold for manure. Respecting this mode of deodorizing the sewage, Dr. Letheby says:—

"The chloride of iron should be dissolved in water, and allowed to run by a graduated stream into the sewage before it reaches the lime. A contrivance should also be used for effecting a perfect mixture of the iron solution with the sewage. This having been accomplished, the sewage should then receive its dose of lime-liquor, and be again well agitated, so as to be thoroughly mixed. In this manner, a heavy, clotty precipitate will be produced, which will rapidly fall in the subsiding tanks, and leave the supernatant liquor clear, and perfectly inoffensive. The proportion of chloride of iron and lime should be about 4.5 grains of the former, and 14 or 15 of the latter to a gallon of sewage. The total for a day's working with 100,000 gallons of sewage would be about 64 pounds of the former, and about 200 pounds of the latter. The quantities should be so regulated that the super natant liquor at the outfall should be clear, colorless, and but faintly alkaline. With this modification of the process, I am of opinion that the sewage works may be conducted and managed so as not to be at all offensive or injurious to those who reside in the neighborhood."

Thus we have a scientific method described for converting the ammonia and phosphate of lime in the sewers of our cities into a portable fertilizing material.

The Resources of Pennsylvania.

The committee appointed to confer with the Auditor-general, in relation to the publication of a map showing the railroads, canals and navigable waters, coalfields, iron factories and oil districts in Pennsylvania, have reported that the State has twenty-five hundred miles of railroad and about a thousand miles of canals, ten thousand square miles of bituminous coal land, four hundred square miles of anthracite, affording nine and one-third million tuns of anthracite, and sixty-seven million bushels of bituminous coal of the tunnage of 1860. Her improved lands' cash value was $662,500,707, agricultural implements, $22,442,842.

Of the total products of iron ore in 1860 in the United States, which were two million five hundred and fourteen thousand two hundred and eighty-two tuns of iron mined, there were one million seven hundred and six thousand four hundred and seventy-six tuns mined in Pennsylvania. The total product of bar iron in the United States in 1860, was four hundred and six thousand two hundred and ninety-eight tuns, of which two hundred and fifty-nine thousand seven hundred and nine tuns were made in Pennsylvania. Pennsylvania contains ninety-three anthracite furnaces, one hundred and fifty charcoal and coke furnaces, one hundred and ten refining forges and ninety-one rolling mills.

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VALUABLE RECEIPTS.

JAPANNING IRON.—The term japanning is derived from a species of hard varnishing applied to articles that were originally obtained in the island of Japan. In Europe and America the term is now applied to articles of paper, tin, and iron coated with a varnish and dried hard in an oven. As an art, japanning was first practiced on metal in Birmingham, England, and it is still carried on upon an extensive scale in that city. In order to japan iron black, the metal is first cleaned to prepare its surface, then it is coated with quick drying oil varnish, colored with asphaltum and lamp-black, and when it is moderately dry, it is baked in a brick oven, gradually heated up to about 300° Fah. The oven used for this purpose is similar to that for baking bread. It is formed of brick, with a flue under the floor.

A good black japan varnish is made as follows: Take asphaltum 10 lbs. and gum anime 4 lbs. and 2½ gallons of linseed oil, and boil these in an iron vessel for about one hour; then add 2 lbs. of dark gum amber, 2 lbs. of litharge very slowly and cautiously, and boil until the varnish becomes stringy, when it is removed, cooled, and thinned for use with turpentine. When the litharge is added it is liable to fume over, therefore it must be fed in small quantities, and stirred with vigor during the period it is being put in.

Another black japan varnish is made with 8 lbs. of fused asphaltum, 2½ gallons of hot boiled linseed oil and 2⅓ lbs. of litharge, all boiled for two hours, when 1⅓ lbs. of dark gum amber are added, and the boiling continued until the varnish becomes thickish, when it is cooled and thinned for use with turpentine. It is put on the articles with a soft hog's hair brush, but some articles may be dipped in it. They are all partially dried before being baked in the oven. The oil is employed to make the varnish tough and waterproof. Asphaltum alone with drying oil may be used for coarse articles, such as iron castings. Superior japanned work is finished by rubbing down and a final coating given of lac varnish, which is made by dissolving gum shellac in alcohol. Amber is too expensive to be used for common japan work. The litharge that is mixed with the oil renders it quick drying by supplying oxygen to it. Common copal varnish, colored with ivory black, also makes a good japan varnish for iron work.

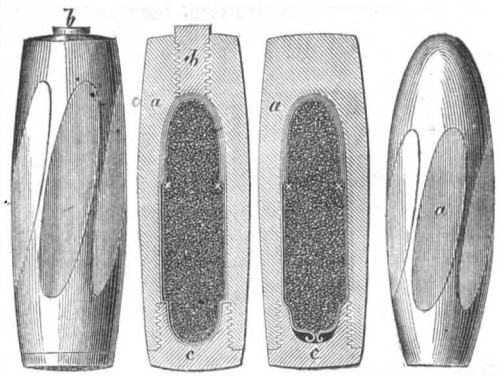
LAUGHING GAS.—The gas which is commonly known by this name, is more appropriately termed "intoxicating gas." It differs from common air in containing about one-third the quantity of oxygen to that of nitrogen; common air containing but about one-fifth of oxygen. In breathing, the carbon of the blood only combines with the oxygen of the air inhaled by the lungs. In common language "the blood is thus vitalized." With the greater quantity of oxygen inhaled in laughing gas, the action of the lungs is intensified, and the blood flowing therefrom to the brain produces a species of intoxication. This gas is made by putting a quantity of pure nitrate of ammonia into a glass retort, and applying the gentle heat of a lamp to it. Violent boiling in the retort must be avoided, or the gas resulting from the nitrate will be impure. The gas is carried from the tube of the retort through water, over which it is collected in a receiver, and from thence it is more usually taken in india-rubber bags for use. It must be allowed to stand a few hours in the receiver before it is used, during which period it deposits a white vapor, then becomes perfectly transparent. When great purity is required, the gas should be passed through a bent tube containing a solution of the proto-sulphate of iron. Four ounces of the nitrate of ammonia produce a cubic foot of this nitrous oxide. Phosphorus, sulphur, charcoal, and iron wire burn in this gas, when previously ignited and placed in it. A piece of potassium placed in a jar containing it and standing over water, inflames and burns brilliantly. This gas is not fitted to support life, yet it may be respired for a short period. It effect upon the human frame are very extraordinary. It is a sort of delirium, differing in its manifestations, according to the constitutions of the persons who inhale it; in general the sensations are pleasurable. In some persons there is an irresistible propensity to laughter, a thrilling of the toes and fingers, and a strong excitement to muscular motions. A stout fellow, whom we witnessed take a dose of it recently, had a strong propensity to violent and lofty leaping; another person dashed at once into a hornpipe of the most exciting heel-and-toe character; while a third tore Shakspeare into tatters with the most energetic theatrical declamations. In most cases it produces cheerfulness afterwards, but in some instances the effects are unpleasant, causing stupor and headache. Persons devoted to mental pursuits are liable to be injuriously affected, and should not partake of it.

WHITWORTH'S IMPROVED SHELL.

We transfer the following description and engravings of Whitworth's improved shell from the columns of the London *Engineer*:—

These improvements by Mr. Whitworth relate to shells intended to be fired through metal plates,

Fig. 1. Fig. 2 Fig. 3. Fig. 4.



suchas may be used as armor for ships, forts, or other defenses. Shells, as heretofore made, have not been fired in an entire condition through armor plates of any considerable thickness, such as the thick plates of iron now commonly applied to ships to protect them from injury from projectiles; they have always broken up upon impact, and when used as live shells the bursting charge has ignited prematurely. It has, therefore, been supposed that comparatively much thinner armor plates would suffice to exclude shells than would be required to keep out solid shot propelled with an equal charge of powder. Now it has been found that one cause of the inefficiency of shells heretofore employed against armor plates has been that the concussion on a shell striking armor plates of any considerable thickness, and with velocity sufficient to penetrate it, generates so much heat as to explode the bursting charge in the shell, thus fracturing it before it has had time to pass through the armor-plating. Another cause of the inefficiency of shells heretofore employed against armor plates has been that the shells have been so weak that the force of the blow has been sufficient to fracture them mechanically; this weakness has arisen usually from the materials of which the shells have been formed being soft or brittle, or both, and in many cases also from the form given to the shell. It is essential, in the construction of shells capable of being used efficiently against armor plates, that the fracture of the shell from the causes above mentioned should be prevented.

In Figs. 1 and 2, *b* is a plug employed to close the passage through the front of the shell; the object in forming this passage is to admit of the body being more thoroughly hardened than it could be were the shell made solid in front; this plug before being screwed into its place is also hardened and tempered. *c* is another metal plug screwed into the rear end of the shell, for closing it after the charge has been introduced. The interior of the shell may be painted or thinly covered with bitumen, marine glue, or other substances such as are used for giving a smooth internal surface to common shells. The bursting charge, which may be powder, such as is commonly employed for this purpose, is then introduced, being first enclosed in a flannel bag or case, in order to prevent the heat generated by impact from being transmitted too rapidly to the bursting charge, and at the fore part of the bag, as far, say, as the points marked ×, ×, several thicknesses of flannel are employed, the number of thicknesses of flannel used being more or less, according to the effect it is desired to produce; the longer the time which it is desired should elapse between the perforation of the armor plate and the explosion of the shell, the greater will be the number of thicknesses of flannel employed. In place of flannel, other materials which transmit heat slowly may be employed, but flannel is most convenient. By these means the patentee is able to make use of the heat generated on the impact of the shell with the armor plating to fire the bursting charge, after the shell has penetrated through the plating.

Fig. 3 is a longitudinal section of a form of shell somewhat different from that shown at Figs. 1 and 2. In this case the body, *a*, is not bored through at the front. The shell need not be charged entirely with gunpowder; there may be just sufficient powder put into it to rend it, and the remaining space may be occupied by destructive or noxious chemical preparations. Gun cotton or compressed powder may be used with advantage for the bursting charge; or explosive agents of a more energetic nature than those may be employed.

The shells described may also be employed for penetration like solid shot, as by removing the center part of the forged piece, which is sometimes unsound, the metal may be made of the degree of hardness required, and which is varied, as described, in different parts of the body of the shell.

The shells shown are adapted to be thrown from a rifled gun with hexagonal bore; if a gun with any other form of bore be employed, a corresponding change will have to be made in the external configuration of the projectile.

Mr. Whitworth has found practically that a shell such as that shown at Figs 1 and 2, having a maximum diameter of 7 inches, and propelled by 27 lbs. of powder, will, at a range of 800 yards, penetrate with facility a 5-inch wrought-iron armor plate supported by a heavy backing of timber and iron skin. It will be remarked that the shells shown are flattened in front, and for penetrating armor plates it is very desirable that this form should be given to them. Where the conditions are such that the shell can be made to strike with its axis perpendicular, or nearly so, to the armor plating, a shell rounded in front may be employed, although even under these conditions it will not penetrate with the same facility as a properly-formed flat-ended projectile, but where the circumstances are such (as they would be in almost every practical case) that it is impossible to secure the shell striking with its axis perpendicular, or nearly so, to the surface of the armor plating attacked, then a shell rounded in front is deflected on striking the armor plating, and either glances off entirely, or expends its momentum with more or less inefficiency, according to the inclination at which it strikes. Shells with flat ends are effective if the object aimed at be below water. Shells constructed according to the invention, may, if desired, be fitted with ordinary fuses, and it is in some cases desirable so to fit them; they will not in this manner be rendered any more useful for employment against iron plating, for which they are primarily intended, but the fuses will enable them to be fired with effect if necessary at objects which will not offer resistance, so as to generate sufficient heat to fire the bursting charge within it, as for example in attacking such a ship as the *Warrior*, which is only partly protected with thick armor plate, the fuse would then insure the explosion of the projectile, which might not otherwise occur if the shell did not strike the thick armor plate.

AN IMPROVED STEAM CARRIAGE.—H. Roper, of Roxbury, Mass., has invented and completed a steam carriage, which, according to report, subserves the ends for which it was made. A recent trial of this innovation upon the "old style" was very successful; it passed through Boston, and, meeting a car on the horse-railroad, turned off the track, and went around the car, with as much ease as if drawn by a horse. On a smooth road or on the rail, with sixty pounds of steam (the usual amount), the carriage can be run at the rate of twenty miles per hour. The weight of the carriage is 650 pounds.

THE editor of the *Alta California* was recently presented with a sack of potatoes, containing only three, each weighing 20 pounds.

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Correspondence

The Distillery Business---Saccharification.

[Continued from page 150.]

Of no less importance than malting, as described in my second article, is the process of saccharification, commonly called mashing. Upon its correct management mainly depends a good yield of whisky, however much the superficial practice of some distillers would lead one to think the contrary.

Starch, or the amylaceous matter of the grain, must be saccharified first; and the sugar thus formed is the basis for the subsequent transformation into alcohol (whisky). The transformation of the starch into sugar takes place by degrees, it having first to be transformed into a peculiar kind of gum, called dextrine, and afterwards into sugar. The very small particles of starch, whose natural sizes vary from $\frac{1}{800}$ to $\frac{1}{10000}$ part of an inch, are composed of many concentric strata or shells, in the shape of an onion, enclosing a kernel. Dried starch exposed to a temperature of 234° Fah., first turns gray, then yellow, then brown, and. when exposed to still higher degrees, will be carbonized. The concentric strata of starch will burst when boiled or scalded with water, and all parts of it are then fully developed (dextrinified) and ready to be exposed to the reaction of the diastase. If one pound of sulphuric acid be added to 100 pounds of water, and starch is then boiled in it, the solution gradually acquires a sweet taste, and ultimately the whole of the starch is converted into grape sugar. If the acid be then neutralized by an alkali—that is to say, separated by the absorption of chalk from the fluid, and the remaining liquor boiled down, a rich sirup or sugar will be obtained. But, for many good reasons, we do not use any acid in converting starch into sugar for distilling purposes. Instead of it, we use diastase (malt). Diastase does not affect raw starch in any way, but it reacts on scalded or developed starch (dextrine).

The grain must be ground first to destroy the adhesiveness of the principle of the grain; and the finer and more uniformly the grain has been ground, the more extensive surface of the starch or the greater number of particles of it will be exposed to the solvent action of the scalding water, and afterwards to the reaction of the diastase—the more complete, in other words, must be the dextrinification and saccharification. To make it possible to convert all dextrine into sugar, a certain quantity or proportion of diastase (malt) to the grain is necessary. The better the quality of the malt, the less of it is required; the richer the grain, the more malt is necessary. Some distillers do not take these circumstances into consideration or remember that a coarsely-ground meal must be scalded at a higher temperature, while a finely ground meal requires a lower degree of heat to be dextrinified. Hence, one portion of meal, of grain not uniformly ground, will be scalded too much, while the other part of it will often be too little scalded. Here I may mention that the meal never should run warm from the millstone, as such practice will destroy the property of a greater part of the starch to be saccharified.

But diastase is not the only requisite for the process of saccharification. A certain proportion of water to the dry substance, certain well defined degrees of temperature and a sufficient length of time, are required as well for the transformation of starch into dextrine as for the transformation of the latter into sugar. If one or the other, or all of these conditions are not complied with, neither a perfect dextrinification nor saccharification can be expected, and, as a necessary consequence, there cannot be a good yield. Suppose we were to use a wrong proportion of water, that is, more than four parts to one pound of meal, then, as a consequence, the mechanical and chemical processes would be disturbed, and there would be either too much or not sufficient room for the action of the diastase and fermentation. The reader will find in my next article that fermentation is caused by very small organized beings, a species of fusoria, and this explains what we say here, that too large a proportion of water must prohibit a good fermentation. Besides, a thicker beer is more fit for keeping the temperature unaltered by external influences, and as the whisky obtained by the fermentation of a rich, thick beer is more concentrated, acetous fermentation cannot set in so easily.

Suppose, again, we should not observe the proper degree of temperature—150° Fah.—then the saccharification would be restrained, and we should produce more gum than sugar; or, by using too high a temperature we should destroy at least a part of the saccharifying property of the diastase; producing merely a large quantity of gum. By not allowing the required time for the action of the diastase—at least one hour and a half—we should intercept the process of saccharification; while, if we were to use less than the necessary quantity of malt, all dextrine could not be converted into sugar. Nothing short of a simultaneous compliance with all the conditions mentioned can insure perfect success or, in other words, secure a good yield.

In many distilleries I found that steam was introduced into the mash tub by means of a pipe, for the purpose of scalding (dextrinifying) the starch. The following explanatory remarks will show how wrong this practice is :—

Water exposed to the most intense heat will never rise to a higher temperature than 212° Fah., because the escaping steam is the very vehicle which leads off the higher degrees of heat. But this steam retained, as, for instance, in a boiler, will absorb or swallow up the higher degrees of heat, although, when it escapes, it will never, even under the greatest possible pressure, show on the thermometer a higher temperature than boiling water, *i.e.*, 212° Fah. Steam in a compressed state, then, contains the higher degrees of heat "bound up;" that is to say, it contains a latent heat, which cannot be indicated by instruments. Steam let out from boilers of high pressure, as found in distilleries, with an average capacity of from 80 to 90 pounds, will carry of a heat from 300 to 400 degrees, and the effect of such a temperature coming in contact with starch in the mash tub can be easily imagined, when, as we have already seen, even 234° Fah. change the quality of the starch—that is, spoil it and make it unfit for dextrinification. In this case the starch will not only be scalded, but backed, and consequently lost for saccharification. There is but one correct way of dextrinifying starch for distilling purposes, and that is by means of boiling water.

The above remarks will suffice to show how great attention and how much knowledge and care is required by the distiller in order to insure safety and success to the process of dextrinification on saccharification, or, as it is more generally called, mashing.

[To be continued.]

Odors.

Messrs. Editors :—M. Piesse, of London, believes he has discovered a gamut of odors; why may not those prosecuting inquiries in this direction find the original odors? As there are a very few primitive colors, of which all others are composed, so there may be a limited number of elementary odors which, combined in various proportions, produce the variety we meet with in nature. The rose and a species of the peony have precisely the same fragrance. According to M. Piesse, the rose-geranium is an octave below. The sweet shrub or calacanthus has the identical scent of an early ripe apple. The heliotrope and vanilla, the Persian lilac and nutmeg, the gillyflower and clove, the jasmine, lily and tulip, are other instances. Mignonnette, grape flower, spirits of turpentine, and white raspberries, have the same odor, but in different proportions. It has been observed by cooks that, when too large a quantity of the oil of lemon was used, the flavor of the dish was no longer lemon but turpentine. Quinces, in a certain state, have the flavor and odor of the onion.

This identity of odor is not confined to the vegetable kingdom; the musk and musk-plant, the oyster and oyster-plant or salsify, the animal known to naturalists as the *mephitis Americana*, and the crown imperial, are obvious illustrations to the contrary. Who can say that in our future botanical works the essential oil scenting the flower will not be included in the description? L. G. S.

Erie, Pa., Feb. 28, 1863.

Fine Steel made in Pittsburgh.

Messrs. Editors :—My attention has been directed to the article in the last number of your valuable journal on the subject of "American Steel." While you award the credit of success to the manufacturers of steel west of the Alleghanies, you seem to labor under a wrong impression in regard to the measure of that success, and especially in this city.

After confining the results here to the fabrication of the cheaper sorts, in which you admit it to be of equal quality, while its cost is less, you say "all the finer sorts of steel, however, are imported in great quantities from England." This is a mistake. There are at this time no less than five different establishments in this city alone engaged either in whole or in part in the manufacture of the best description of cast steel for edge tools, fine cutlery, &c.; and the largest of these is exclusively devoted to the manufacture of best cast steel, with eminent success, as is clearly proved by the fact that some of the largest manufacturers of edge tools, table cutlery, reapers, skates, saws, files, &c., in New England obtain their principal supply from that concern. New York and New England are large customers for Pittsburgh best cast steel; and wherever it has been introduced, its superiority over imported English steel has been demonstrated, and it is preferred at the same price.

This steel is sold at a lower price, not because of its being of an inferior quality to the best English brands, but because it can be afforded at less and still yield a satisfactory profit to the manufacturer. If you desire testimony from consumers, I will take great pleasure in furnishing you with a "cloud of witnesses" to attest all I allege in favor of the quality of best cast steel made here.

I forgot to mention before that, besides those engaged here in the manufacture of best cast steel, there are at least as many more who confine their operations to the production of the commoner descriptions of steel. In magnitude, several of our steel concerns will compare favorably with their English rivals.

Believing that you would not willingly inflict a wrong upon so meritorious a class as the steel converters of this country, I have taken this means of correcting your impressions, and hope you will do us the justice to make the correction.

James M. Cooper.

Pittsburgh, Pa., Feb. 28, 1863.

[We are certainly much gratified to learn that the business of manufacturing from steel has obtained a good foothold in this country, and we wish it success. Not long since we were told by an extensive wire manufacturer in New England that he could not obtain American-made steel good enough for his use, and he urged on us the importance of stirring up our manufacturers to produce better qualities. The business of steel-making is one of great importance and ought to engage increased attention. We do not feel willing to depend upon any foreign nation for a single article of prime necessity, whenever it can be produced in this country. We would like to enquire of our iron manufacturers if they are able to produce an article of iron fit for gun barrels? And, if not, why not? We were informed a short time since by a manufacturer of fire-arms that he was obliged to depend upon the English market for his iron, and that the Springfield musket barrels were made from Marshall's iron, imported from Birmingham, England.—Eds.

Sorghum Cane and Sugar.

Messrs. Editors :—In your issue of January 10th you refer to a convention of the manufacturers of sorghum and imphee sirup and sugar, which was held at Rockford, Ill., in December last, where I am reported as relating "some very useful experience." As that report is meager, and as you invite your readers who have been successful in making sorghum sirup, to communicate their processes for the benefit of the public, through your columns, I think this new and important branch of agricultural industry will be advanced by giving you the process by which I have manufactured several hundred weight of sugar like the sample I now send you. This is in a crude state, just as it granulated in the sirup, standing in an open vat. I also send you a sample of the sirup. But to the process :—

The juice is expressed through iron rollers, and

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evaporated in a series of pans, by a process patented by myself (Patent No. 35,350) known as "Moss & Williams's Oscillating Evaporator." The juice flows into the front end of the first pan, or the one directly over the fire. A reservoir should be provided to receive the juice from the mill, which should hold enough to provide against inconveniences from any temporary stoppages of the mill. The boiling should not be stopped until the day's work is finished. The juice should run into a box twenty inches square, filled every morning with clean straw; this makes a good filter. The reservoir should be placed high enough to run the juice into the first pan. A faucet should be two inches or more from the bottom of the reservoir, and the flow so regulated as to furnish juice only as fast as it is evaporated. The constant stream of cold juice keeps the front end of the pan below the boiling point, and makes a defacating space sufficient for the removal of the scum, which by the ebullition will accumulate there; this green scum should be removed from the first pan, and may be done every half hour and even less frequently. Dip from that part of the first pan which is boiling into the second pan, taking care to keep in this pan a quantity sufficient to supply the third or finishing pan. Dip from the second into the finishing pan at once enough to make from two to four gallons of sirup, so that no more will be required until this is finished and discharged into the cooler. The juice in the first pan should never be more than an inch in depth, and in the second and third there should be just as little as can be conveniently operated, for the thinner the film of juice the more rapid the evaporation and the better the product. When the evaporation is about half completed, or at 225°, a mucilage arises, which is not separable at a lower temperature, this, with the scum from the finishing pan, should be removed. When the charge in the finishing pan begins to boil there will arise a brown scum, which should also be removed. The rocking of the pan should then commence, and be continued unremittingly until the process is completed, keeping the sirup boiling all the time. The more rapid the operation the more satisfactory will be the product, and the hotter the fire the better, for the rocking prevents the burning, as each particle of the sirup is brought in contact with the bottom of the pan. The sirup cannot be burned until the process is finished, for the whole mass is equally heated, and the heat required for finishing the sirup, viz 238°, is below the point at which the sirup will burn. Litt the pan from the arch and empty into the cooler, which should be a shallow vat, and stir occasionally until cool.

But little crystallizable sugar is obtained from the upper joints of the cane, though all may be ground together, as working a part at a time increases the labor, without very materially changing the results. There is no difficulty (with ordinary skill) in making good sugar from ripe and excellent sirup from unripe cane by the above process. The pans should be thoroughly cleansed each day. Good dry wood is indispensable in making sugar or first-rate sirup. In a room at an ordinary temperature, in open vats, granulation commences in from one to ten days, though it may not be completed—that is, the whole mass may not become sugar—before as many months. If, however, the cane was ripe, the boiling rapid, and the operation conducted as above, good sugar is certain.

J. M. Moss.

Waverly, Iowa, Jan. 26, 1863.

An Extraordinary Mode of Defending Harbors.

Messrs. Editors.—In the last number of the Scientific American received here (Jan. 3d) you stated that you wished to receive some suggestions relating to harbor defenses. I herewith give you an idea which may or may not be practicable; of this I leave you to judge:—Supposing the entrance into an harbor to be narrow, and a good fort or other stronghold to be in the neighborhood, with a convenient place for a steam engine; from this lay down pipes of from three to six inches in diameter, directly across the channel where the vessels have to pass; the pipes are provided with several valves, so that no water can enter them. When required, fill the pipes with native distilled *coal oil* or other hydro-carbon liquids; then apply a force pump at the end nearest to the fort and force through the pipes a continued stream of oil, which, by the pressure, opens the valves and discharges the liquid oil. This oil being lighter than the water, floats to the top, and can then be set on fire, either by Congreve rockets thrown from the land or by a preparation which, together with the oil, is forced through the pipes and would ignite when coming in contact with the air. There may be also forced through the pipes a quantity of small explosive shells which would do some service. The ignited oil will not only set the combustible parts of the ships on fire but will create such a dense and unpleasant smoke as to blind and suffocate officers and crews on board the vessels. I have been once in the midst of the fire and smoke of burning petroleum; and therefore I know that any one who has once experienced its horrors will never wish to be surrounded by it a second time.

J. M.

Dolgelly, North Wales, January 24, 1863.

Frictional Gearing.

Messrs. Editors.—As the subject of frictional gearing is exciting considerable attention just now, I am induced to give your readers an idea of an application of smooth-faced friction wheels which were once used at a woolen factory at Wotton-under-edge, Gloucestershire, England, in which I was at that time (1803) employed. Among others was a machine we called the gig-mill which carried the teazles for dressing the face of the cloth. It was driven with a varying force of from two to twelve horse-power, and required to be stopped and started a great number of times to change the teazle, &c. It was worked by a pair of what we called friction wheels, the rings being built of segments of wood to a thickness of square of 5 or 6 inches and a diameter of 4 feet 6 inches. As they were continually wetted by the spray from the cloth they were not very durable still they worked well for many years. These wheels worked on horizontal shafts in a line with each other—one shaft sliding in its bearings endways and having a lever attached, or it might be slid on the shaft causing it to retire from and approach the other. The faces of the wheels were smooth, and when pressed together the adhesion was sufficient to drive the machine above-mentioned. Some eight or ten years after an improvement was made by using cast-iron wheels some 2 feet 10 inches in diameter and weighing perhaps 550 pounds. The square edges of the driving wheel were turned, as well as the inside bevel, so that a number of smooth-faced wheels might be applied to it. This edge was beveled about $\frac{5}{16}$ths of an inch. The arms of the wheel were strengthened by a feather on the back. These wheels worked admirably for fifteen years and possibly are doing so yet. I have turned quite a number with a hand tool; slides or engine lathes not being much used then. I see no reason why the grooved frictional gearing should not work well, as I know from experience smooth-faced ones do still.

R. Chappel.

Fonthill, C. W., Feb. 28, 1863.

[Our readers will understand our correspondent's friction gearing when we say that it is the same as a disk valve fitting close into its seat. We should be glad to have further information on the subject from any one who may be in possession of it. The days of toothed gears, for many purposes, are numbered or ought to be. Out with them!—Eds.

The Origin of Some Words.

Some of the most beautiful fancies with which modern poetry is graced are borrowed from the tales of gods and goddesses as depicted in the heathen mythologies. The heavens—vast and trackless as they appear—are full of constellations and of single stars named after ancient heroes and mighty warriors, celebrated in song or in the chase. There are also words in common use which derive their signification from some of the ancient gods or deities whose names they received. "Panic" is one of these words; the definition of it is causeless or unnecessary fear. *Pan* was a rural deity who wandered on the mountains or in the valleys; he was dreaded by such persons as were obliged to pass through the shadowy paths in forests or in glades; the association of such scenes naturally predisposing the mind to alarm and superstitious fears. Any sudden fright, therefore, without visible cause, is to this day called a "panic."

Experiments in Exploding Field Mines by Electricity.

The editor of the Washington *Chronicle* gives the following description of some experiments which he recently witnessed with field mines, which were exploded near the forts on the Virginia side of the Potomac by means of electricity:—

Arriving on the ground, we learned that his Excellency the President was there, accompanied by the Secretary of War, General Heintzelman, General Barnard, General Abercrombie and many other officers of less note. Soon after there was a great explosion immediately in our front; the earth opened and vomited forth stones, shot and shell, vertically, horizontally, and, in fact, in all directions.

Immediately around us were a number of the officers of the signal corps, busily engaged in connecting the wires of a field telegraph to its support, and among them we saw Professor Beardslee, the inventor of the telegraph apparatus now used in our armies. From him we learned that he was exhibititing the application of his new electro-magnetic machine to the explosion of mines, and that he was now ready to fire another.

Quick as the wires could carry the spark there was another explosion even greater than the first, and the air was again filled with earth and smoke, stones and exploding shells; some of the latter falling in uncomfortable proximity to our person.

A third mine was exploded in the same manner. In fact, we should judge from appearances that the ground in front of our forts had been extensively mined, and it is only necessary for Professor Beardslee to connect his apparatus with them, pass the word and they will be exploded.

An order was now passed from Colonel Alexander, of the Engineers, who appeared to have charge of the operations, for the crowd to fall back to a greater distance, as a *fougasse* was about to be fired.

Taking up our position close to the President, we watched for the *fougasse*. We heard a heavy explosion, as if some of the internal fires of the globe were escaping, and the earth belched forth a volcano of smoke, stones and exploding shells even more fearful than before. It rained stones for acres around and in front of it, and must have carried annihilation to any assaulting column in the neighborhood. Immediately after this explosion, there was a rush of the soldiers to see the *fougasse*, but a heap of ruins only showed where it had been placed.

About Tools.

We find it very convenient and profitable to have a work-bench and a set of tools, consisting of three planes, three saws (one cross cut hand-saw, one slitting saw and one panel saw, for trimming, &c.), a bit-stock with a set of bits to fit, five chisels, a square and scratch awl, a drawing knife, one pair of small pincers, a hammer and a nail-box, a drawer in work-bench with partitions to put an assortment of bolts, screws, wrought nails, tacks, files, whetstones, chalk and lime, &c.

The above bench, tools and all, will cost about thirty dollars, and if well taken care of, will last a farmer's lifetime. Now, if he has much ingenuity, can save enough by doing his own repairing at odd spells to pay for the tools in two years, and in some cases in one year. Many times during the year something will break when most needed—a horse-rake, for instance; and while you are going to some mechanic to have it fixed, you could mend it yourself, and save expense, if you only had the tools. You could also make your wagon boxes, hay-racks, sheep and cattle racks, milk-rack, sheep troughs, ladders, board fence and picket fence, farm gates, grape trellis and a thousand and one other things, which, if bought or hired made, would cost three times as much and you would not like them as well; like the lady who cultivated one flower and said she admired it more than all remaining in the garden which the gardener had attended.

[The above sensible advice we copy from the *Rural New Yorker*. We would add that if any of our readers are in want of a chest of tools similar in kind to those recommended, we advise him to address George Parr, Buffalo, N. Y., for a list of prices and sizes of different tool-chests which he makes and sells.—Eds.

The Albany *Standard* announces that it will hereafter be printed on common manilla paper, and sold at one cent per copy.

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Improved Car Wheel.

In rounding curves on railroads, great strain and friction is brought to bear upon the side of the track by the flanges of the car wheels; the effect produced is an increased consumption of the tractive force and an injurious abrasion of the wheels themselves. Not unfrequently, by the breaking of a flange at such points, entire trains are thrown from the track and precipitated down embankments or otherwise seriously damaged. These difficulties and dangers are measurably overcome by the car wheel here illustrated. It consists in applying a revolving band or tread to the wheel, which, by slipping on the main part of the same, eases the lateral strain. Fig. 1 shows the loose tread, A, made of wrought iron or any other metal most desirable for the purpose. Fig. 2 is a representation of the wheel with the seat, *a*, for the loose tread turned on it. Fig. 3 is a view of the wheel with the tread in place, and Fig. 4 is the remainder of the wheel, which is inserted in Fig. 3, and there secured immovably by bolts. The apertures, *b*, allow oiling of the ring when necessary; the three stops or projections meet the ring on Fig. 3, and keep it at any distance to which it may be regulated so as to permit more or less lateral play. This invention is clearly explained by the engraving, and its operations will be apparent to all intelligent persons. As the train sweeps around the curve the loose tread recedes or advances, laterally, on the seat, and greatly facilitates the movement; it also prevents that side play and oscillation so disagreeable in the cars, which is caused by the unequal action of the flanges of the wheel against the side of the track. This wheel is the invention of Mr. Geo. C. Beecher, of Livonia Station, N. Y., and was patented Jan. 6, 1863. Further information can be had by addressing the inventor as above.

Fig. 1

Fig. 2

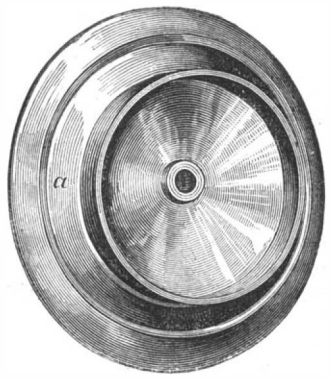


Fig. 3

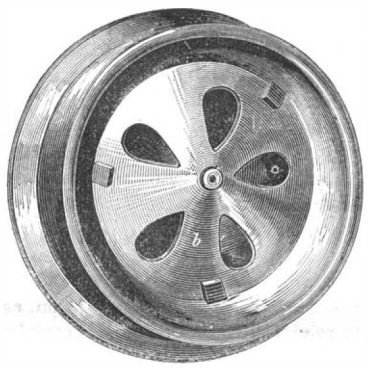
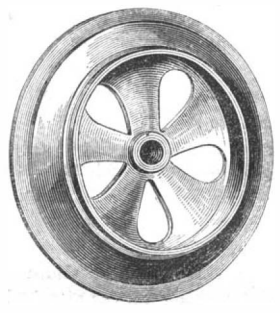


Fig. 4



Ahlstrom's Patent Expansion Screw Fastening.

A very excellent and convenient little invention is advertised in another column of the Scientific American, to which we desire to call the attention of our readers. It is an expansion screw or bolt surrounded by a slotted case having a crotch at the bottom, into which a wedge-shaped nut is drawn by turning the screw itself, this expands the case very forcibly against the sides of any hole in which it may be placed. It is particularly useful in the army and navy or other situations where the conveniences for drilling and tapping holes are not at hand; also for foundrymen, carpenters and marble and stone cutters; in fact, the patent expanding screw fastening will be found available in every mechanical occupation. Our readers who use such things should give it a trial.

Sizes of Steam Cylinders.

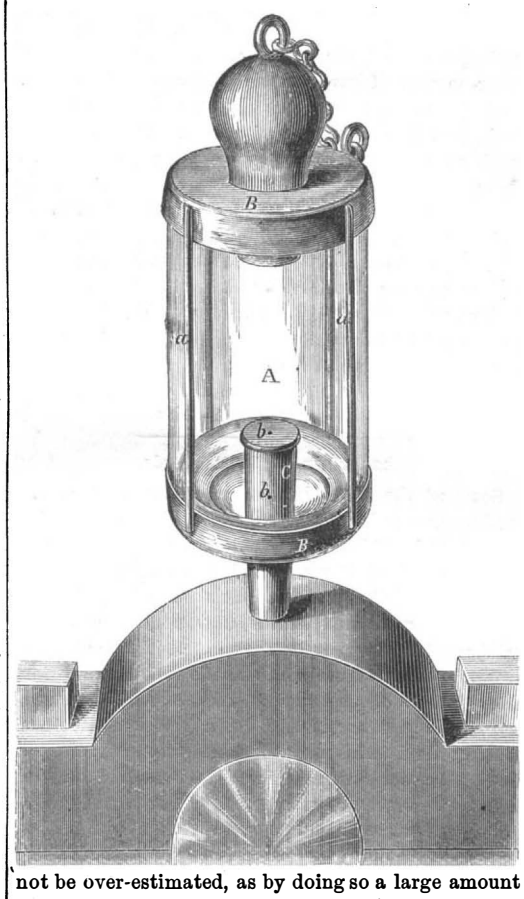
Much confusion and popular ignorance exists upon this point, and errors of statement are continually made respecting this or that steamship or boat. There are two vessels building in this city, called the *Dictator*—one is the famous iron-clad battery of that name, the other is a North river steamer; the iron-clad will have two cylinders each 100 inches in diameter by 4 feet stroke of piston; the latter vessel will have one cylinder 83 inches in diameter and 16 feet stroke of piston. The *Dunderberg* will have engines whose cylinders are of similar dimensions to the *Dictator's*. The largest steam cylinder in any steamboat or steam vessel in this country, known to us, is 105 inches; the cylinder of the *Metropolis*—a Sound boat—is of this size, as are also those furnished to the *Golden City* (now building), and the *Constitution* belonging to the Pacific Mail Company; these vessels are the only ones that have cylinders 105 inches in diameter.

The exportations of fresh meats from the Western States to Europe, by the way of Portland, Maine, (says the Portland *Press*) has grown to be an extensive business. The meats are cut up, partially dried and packed in boxes from three to four feet square; dry salted sufficiently to preserve them on their passage. They are brought by railroad from Ohio, Illinois, &c., and shipped principally by the Canadian line of steamers from Portland. During the month of January last, these steamers took 12,950 packages of meat, containing 7,371,360 pounds, valued at $870,496 60. Lard, hams, &c., are also exported largely by the same line.

BEECHER'S PATENT CAR WHEEL.

DEWIES' PATENT OIL CUP.

The importance of oiling machinery properly cannot be over-estimated, as by doing so a large amount of time and money is saved which would be expended in repairs. Very frequently lines of shafting get heated in their bearings in consequence of having been neglected, and when they are in this condition the metals in contact cut and tear each other and destroy that fine surface which is so necessary to easy running machinery. Herewith we illustrate a new and ingenious oil cup constructed on well-known philosophical laws; it effects a steady and constant lubrication of any machinery to which it may be applied.



It consists of the glass cylinder, A, confined between two metal caps, B, by the small rods, *a*. The tin tube, C, inserted in the bottom, has two small holes, *b b*, in it through which the oil is fed down to the axle below. The principle upon which this cup works is that of atmospheric pressure and a limited capillary attraction. The rotation of the shaft below is said to cause a partial vacuum in the tube, by which, and the capillary attraction of the small holes, the fluid finds its way down to the shaft. The advantages of such a self-feeding oil cup are very great, and the transparent walls also afford a means of readily observing the quantity of the lubricator supplied to the work. All the oil which passes through the tube must of necessity fall upon the shaft, and as the cup operates only when the machinery is in motion, it will be seen that it is what it purports to be—an automatic oil-feeder. A great saving attends the use of such appliances to machinery, as the expense of a special attendant in the factory is obviated, and by keeping all the wearing surfaces of machinery thoroughly oiled less motive power is required and less expense is entailed on the proprietor for repairs. These cups can be regulated for the amount of work they are required to do, that is, to feed fast or slow; and, we think, they will give satisfaction to those requiring such instruments. This cup was patented on October 21, 1862, by A. C. Dewies, of the kingdom of Prussia, and further information may be had by addressing C. Tollner and Hammacher 209 Bowery, New York.

A Difficult Task well executed.

We recently saw a large gun at the Novelty Iron Works, in process of construction, which was 13 feet 2 inches in length. The gun is cast solid, and is of a peculiar shape and design. The bore, when finished and rifled, one turn in 36 inches, is to be only $2\frac{5}{16}$ths inches; the initial bore, two inches in diameter, was put through the gun from end to end safely, in a common lathe, by Mr. William Wade, a skillful mechanic employed at the Works. The operation was one attended with much anxiety, as it was uncertain whether the texture of the iron was homogeneous throughout. Apprehensions were expressed that fissures or blowholes might exist, which would divert the point of the drill from its center, but, fortunately, the tool went through and came out at the right place. This is a very successful performance, and we doubt if the counterpart of it can be produced. The wrought-iron turret-shaft of the *Monitor*, 6 feet in length, had a $1\frac{1}{4}$-inch hole bored through it, at the same Works, but the other achievement is something more difficult than even the last one quoted.

Amusing.—A Boston contemporary understands that Martin Farquhar Tupper, the author of "Proverbial Philosophy," wrote a short time ago to a prominent senator of the United States, entreating him to exert his influence with the President to prevent the latter from using the guillotine which he had imported for decapitating the rebels! It expects soon to hear from English sources that the Vicksburgh "cut off" is a machine for cutting off rebel heads, and would not be surprised if a remonstrance against its barbarity was sent to the Commander-in-Chief.

The quantity of anthracite coal sent to market in 1862, was 7,955,206 tuns, being an increase of 314,948 tuns over the quantity sent in 1861.

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VOL. VIII, NO. 11...[NEW SERIES]....*Nineteenth Year*

NEW YORK, SATURDAY, MARCH 14, 1863.

WHAT CAN BE DONE FOR INVENTORS---ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the emittance.

The publishers of this paper have been engaged in procuring patents for the past SEVENTEEN years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application. We also publish a large pamphlet containing the PATENT LAWS of the United States with a digest of facts relative to the rights of inventors and assignees. This pamphlet is important to every person who owns a patent or is about to apply for one. Sent by mail on receipt of six cents.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,
No. 37 Park Row, New York.

CULTIVATE FLAX.

At no time since the introduction of cotton cultivation in this country, and the use of cotton in the arts, did it reach to its present high price in the market. The same quality which sold for twelve cents per pound in 1860, is now selling for ninety cents. The cause of this is well known—three-fifths of the supply have been cut off by the war. Could an abundance of flax be obtained, probably the use of cotton would almost cease as an article for manufacturing purposes. As there are no prospects at present of an adequate supply of cotton being furnished for several years to come, our farmers should more generally engage in the cultivation of flax as one of their crops. If each of the farmers in the Northern States would devote a few acres this year to the raising of this fibrous material, a very large quantity would be thus secured for manufacturing purposes, and for linseed oil. The fiber would be used in place of cotton, and the oil obtained from the seed would render us independent of India for this useful substance. It is true, a greater quantity of flax was raised last year than for many years previously; still the supply did not meet the demand. A large number of the manufacturers of woolen goods have found it superior to cotton as a mixture with wool, and hereafter they will use it by preference for this purpose, if they can obtain sufficient quantities at reasonable prices; and besides its employment in such fabrics, there are many other purposes for which it is equally as applicable and useful.

Formerly flax was extensively cultivated in New England, New York, New Jersey and Pennsylvania. Every farmer was accustomed to raise a sufficient quantity to make coarse family shirting and sheeting. It was spun on hand wheels, and woven in hand looms in each household. The same climate and soil for its successful cultivation still exist, and beyond this we have now in the Western States the most extensive domain and the best soil and climate in the world for raising it in unlimited quantities. We are confident that our Western States may raise flax and become to the textile manufacturers of the world what the Southern States have been to them in raising cotton; and now is the time to make preparations for engaging in such efforts.

In the Eastern States the early part of May is perhaps the best time to prepare the land; in the Western States the latter end of April is the best. The soil should be plowed deep, and pulverized with a fine-toothed harrow, rolled, and put into as good a condition as an onion bed. A loamy soil, which had been planted the year previously with potatoes, answers admirably for flax. As it respects the quantity of seed to be used, Mr. George Anderson, of Lansingburgh, N. Y., who is very well informed on the culture and manufacture of flax in Europe and America, stated in a communication on page 310, Vol. VI. (new series), of the SCIENTIFIC AMERICAN, that "from a bushel to a bushel and a quarter per acre, gave the best results" in Northern New York. In Illinois about three quarters of a bushel of seed to the acre have given about the best returns. In Ireland a much greater quantity of seed is used, but thick sowing is not attended with such favorable results in America. Many Irish flax-growers who have come to America, have abandoned thick sowing after repeated trials. From the flax raised on one acre of ground, about fourteen bushels of good seed can be obtained, and for the seed alone, the crop is not unremunerative. But it is for fiber chiefly that we are urging its cultivation, and certainly six hundred pounds of good fiber can be raised from an acre of land. At thirty cents per pound (one-third that of cotton at present prices), the value of an acre's product, would be not less than one hundred and eighty dollars. Never before has such an inviting prospect for the cultivation of flax been presented to our farmers.

ABUSES IN PUBLIC CONVEYANCES.

It is hazarding very little to say that the means of public conveyance in this city are entirely and utterly inadequate to meet the wants of our people. The omnibuses in old times, twenty years ago for instance, ran for a shilling about half the distance they now travel for five and six cents, and were clean, comfortable and well managed. To-day, mildly speaking, some of our lines of omnibuses are a disgusting nuisance. They are infested with rowdies, drunken men and other objectionable characters, who ought never to be allowed to enter. We have repeatedly been witness to the entrance of men into a stage when they were so intoxicated as to be almost unable to stand. Why these louts are taken up by the drivers is a mystery to us, except on the supposition that they have no self-respect themselves, and suppose other persons to be equally deficient. It is high time these abuses were stopped; the public now generally prefer to walk rather than to be submitted to such degradation and discomfort as attends a ride in an omnibus for any distance. Not only are these abuses conspicuous in the management of omnibus lines in this city, but a thorough reform is needed in the construction of the vehicle itself. Time is valuable, and it is only by economizing it that the public can keep their heads to the current. They cannot afford to walk where they can save a quarter of an hour by riding, and this is one reason why the demand is so great for public conveyance; another reason, and one that is generally kept out of sight, is that Jonathan is prone to be lazy sometimes, and had much rather loll on a cushion than to use his legs. But to whatever cause we may legitimately attribute the demand, it is certain that it exists; witness, in proof, the crowded cars and omnibuses that rumble up town every night, overloaded, yet besieged by numbers who turn away unsatisfied. Those who do secure a place are generally hustled and elbowed out of it, so that in the end they are rather sorry that they did not walk. Yet again some individual enters and beholds five women spread out on the seats on either side, who, if they regard at all the glances which he throws toward the unoccupied seats, only acknowledge the claim by mildly beaming, or impertinently gaping down his modest suggestion.

This is all wrong. Men have some claims as well as the women, but when, fatigued with the duties of the day, they enter the omnibus, which ought to afford them repose, they are too often cheated out of its comforts by the insolent and ill-bred occupants. The remedy for this is very plain; the ferry-boats teach people good manners in this respect, by partitioning off the seats with railing, so that no greedy individual can take up more than the law allows him. So should it be in the omnibus; divide the seats, give to each person his proper sphere and this evil will have been abolished. If the fare is not high enough to pay for all these comforts, raise it, and the better class of people will pay it. Rowdies and drunken men are not human beings, in a social sense, and are entitled to no more consideration than animals. The steps of the omnibuses require altering materially. No lady can get into one now-a-days without violating her dignity, to say the least. The steps might be made lower or to act automatically, by projecting forward as the door is opened, they would then be out of the way and afford no resting place for the dead weight of boys that generally encumbers them.

We are continually bragging about our energy and progressive principles, and abusing John Bull roundly for being an old fogy and an antediluvian, but John has had the sense to see that the streets of London must be relieved of the pressure of traffic, and has accordingly tunneled beneath them and is now running the underground railroad successfully. We must submit, meanwhile, to a few more years of discomfort and inconvenience, and finally adopt the same idea. Why not have a subterranean railroad of this kind? Anybody who has witnessed the "confusion worse confounded" that exists at that gorge opposite the Museum, where streets converge from all points, must see at once that some speedy relief is not only desirable but demanded.

HARBOR DEFENSE—A NEW USE FOR PETROLEUM.

We publish, on another page, a communication all the way from North Wales, in which the writer suggests a mode of harbor defense which is at once novel and extraordinary. He proposes that petroleum oil, with the aid of rockets, be used to set fire to the enemy's fleet. Let us inquire into this scheme and see how far it can be successfully employed. Of the article of petroleum we have an abundant supply, but how shall we collect and store it in quantities sufficient to meet the emergency?—that is the practical question. If the famous Oil Creek in Pennsylvania could be turned this way, we could set about building a huge aqueduct to conduct it to a suitable reservoir for its receptacle, dug out of the crown of Staten Island. A sluice way could be made to the base of

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the island, just above Fort Richmond, and upon the signal being given of the approach of the enemy's fleet, the flood-gate could be opened, and a stream of oil could be poured down into the channel, which, when set on fire, would envelope the vessels in a perfect fire of Pandemonium. If the tide should be flowing at the time, the fleet could be allowed to pass up the Narrows, and thus the oil would create a fire in the rear which would be bound to overtake and destroy the fleet. In order to protect the city from the devouring element, steam fire-engines could be posted along the docks, and especially at the battery, by which instrumentality the flames could be successfully fought away, should an attempt be made, in their progress, to swallow up the city. The plan here proposed would be better than the one suggested by our correspondent, as we doubt if pipes laid across the channel could be relied on as able to supply a sufficient quantity of oil for the purpose. Petroleum oil is now selling at 38 cents per gallon, and we suggest to the Goverement that now, if ever, is the time to gather up this destructive weapon of naval warfare.

PHOTO-LITHOGRAPHY.

A very interesting paper was lately read before the Glasgow (Scotland) Photographic Association by Mr. Andrew Mactear on the art of taking photographs on lithographic stone and printing therefrom. Perhaps there is no branch of the ornamental printing art which deserves so much attention as this. The power of taking copies of objects by photography on stone, then etching and printing direct from these copies, is wonderful. The following is the mode of preparing the stone and taking the photographs as described by Mr. Mactear and published in the *Photographic News*. The system is that of Mr. Gibbons, of Glasgow, and has been practiced by him since 1859 :—

1. Grain a lithographic stone with fine sand or emery flour, taking care to avoid scratches; wash it well and thoroughly dry it before using.

2. Sensitive solution. Copal varnish, one ounce and a half; raw linseed oil, half an ounce; bichromate of potash, two ounces and a half. Grind these three very finely and put into a bottle; then add Brunswick black, one ounce; mastic varnish, half an ounce; turpentine, one ounce. Put these three also into the bottle and mix well together.

3. Coat the stone carefully with the above solution, by pouring a little on the stone, and roll over with a clean lithographic roller till it has evenly and thinly spread over its whole surface, which dries in a short time.

4. The picture is first taken in the usual way on glass to form the negative, which is placed collodion side next the stone, and is kept from shifting by being stuck down by gummed paper round the edges. It is exposed from one to five hours, according to the strength of light.

5. After exposure, remove the negative picture, and with a tuft of fine cotton-wool, soaked in linseed oil, rub gently over the stone, when the parts of the picture not acted on by the light will gradually come away, leaving the graduated tints quite firm.

6. The oil is now cleaned from the stone to prepare it for etching, as follows :—Take a pitcher containing clean water, add to it concentrated dissolved gum arabic until it supports the hydrometer at six degrees, then add nitric acid until the preparation is seven degrees in strength.

7. Take shoemaker's rosin or common clay and make an enbankment around the edges of the stone about one inch deep. The etching solution, prepared with gum arabic and nitric acid as described, is now poured over the face of the stone and allowed to remain upon it for about fifteen minutes. The parts of the picture on the stone not acted upon by light are etched by the nitric acid, while the other parts remain unaffected, and thus the photographic copy is obtained for printing on the stone. The etching acid is next washed off; the stone is charged with ink by a roller in the usual way and the printing proceeded with. The stone must be used quite cold. About 3,000 copies have been printed from a stone thus prepared.

The original inventor of this art is Mr. Niepce de St. Victor, of France, who used bitumen dissolved in essential oil of lavender, and took his pictures on steel plates, which were afterwards etched and printed from. The action of light renders the bichromate of potash insoluble in the preparation. There is still wide scope for improvement in this beautiful compound chemical and mechanical art. It promises to become a most important practical art at some future day. Hitherto it has been practised to a very limited extent.

UNSAFE RAILROAD BRIDGES.

The *Railroad Record* directs attention to the insecurity of wooden bridges for railroads, and says :—

An accident recently occurred on the Ohio and Mississippi Railroad, which fully demonstrated our proposition. A construction train, consisting of a locomotive and two cars, was stopped on a bridge for some cause, and while standing there quietly, the whole structure gave way, precipitating the locomotive into the river, and killing a mason who was at work below. A human life was lost, and a large amount of property destroyed. Had this been a passenger train instead of a construction train, there is no telling what extent of damage might have been caused. Now in all this the railroad company were perhaps but little to blame. The bridge was not over six years old, and the company had taken every precaution in the outset to procure good material. The timber of which it was made was brought from New York for the purpose of having the very best that could be obtained; and yet this is the second bridge within a year that has thus unaccountably failed on this line alone. The fault, if any can be found, dies in the material. Wooden structures are not fit for railroad purposes, and should be abandoned for those of iron or stone.

Such suggestions should not only arrest the attention of civil engineers and railroad companies, but the whole people; as all persons are interested in the safety of railroad traveling. A few years ago a large number of persons lost their lives by the breaking-down of a rotten railroad bridge, at Whitestown, N. Y., on the Central Railroad, belonging to one of the most wealthy corporations in the country; and many similar cases could be cited to prove that such structures are unfitted for railroad purposes. The nature of timber is such that it commences to decay from the very moment it is exposed to atmospheric influences in a bridge. As such structures are composed of so many parts, and some of these are so much more exposed than others, it frequently happens that some portions will become quite rotten, while others are sound. And as the strength of a bridge is just in proportion to its weakest part, it follows, as a matter of course, that wooden bridges are very unreliable, on account of the perishable material of which they are made. Wherever it is possible to erect a good stone bridge, or one of iron, wood should not be employed. It is far more costly to build stone and iron bridges at first, but in the "long run" they are the cheapest, because they are more durable and safe, and require less repairs. A single accident like that to which we have alluded on the New York Central Railroad costs more to a company, for damages, than would suffice to have built a score of iron bridges. As a question of economy as well as safety, therefore, railroad companies would consult their best interests by building all their bridges of the most reliable and enduring materials.

"HOW NOT TO DO IT."

A withering blight seems to have fallen upon the once proud prestige of our navy. Where, in former years, it bore the flag of the Union triumphantly on all seas, it now contents itself simply with *not* being annihilated by the assault of a patched-up rebel ram or two, or else glorifies its achievements in taking some audacious blockade-runner. The *Florida* and the *Alabama* pursue their ravages unchecked; they sink, burn and destroy in their own time and at their own sweet will; and we are told semi-officially through some "our correspondent," how impossible it is to capture them. A gratifying assurance truly!

Only a few days since the telegraph brought us news that our gallant ram, the *Queen of the West*, had been disabled and captured through the treachery of the rebel pilot temporarily placed in charge. While we were recovering from this shock, another one was communicated to us by the announcement of the capture of the bran-new iron-plated gunboat *Indianola*. She is four hundred and forty-two tuns burthen, and was built to carry two guns. She was constructed according to plans issued from the Navy Department, and is one hundred and seventy-five feet in length, fifty-one and a half feet broad, six feet in depth of hold, and draws, with all on board, but six feet three inches of water. The thickness of her bottom planking is five inches, of her lining three inches, of her sides four inches, and of her deck four and a half inches. Over all is a strong layer of iron-plating. Her flooring timbers are ten inches square. She is flat-bottomed and without a keel for navigating shallow waters. Her sides spread out from the bottom to the deck at an angle of forty-five degrees, and fall in above deck at a similar angle, for the purpose of glancing off shot aimed at her. The gunners are protected by a kind of casemate formed by the construction of the vessel, which gives it the appearance of a mud turtle. The cost of building this vessel was about one hundred thousand dollars. Lieutenant Commander George Brown was the last officer reported having charge of her. The *Indianola* was on her first trial trip, it seems, and signalized her advent into rebel regions by falling into rebel hands. The Government has five more vessels similar to the one lately lost, but we suggest that they be laid up in ordinary until some thing be done with those in command on the Mississippi. To build a new navy for the rebels would seem to be rather an unwise and costly undertaking at present. Where are the Decaturs, the Porters and the Perrys of ancient renown?

SLEEPERS FOR RAILWAYS.

Some very useful information on the subject of preserving railway sleepers was lately presented at the Institution of Civil Engineers (England) by Mr. B. MacMaster, C. E., who has had much experience in India, where the decay of sleepers is very rapid owing to active atmospheric influences in a tropical climate. He stated that between thirty and forty per cent of the sleepers on the Madras Railway required renewal annually. Thirteen hundred sleepers made of sixteen different kinds of wood were submitted to careful experimental tests, and were examined twice in twelve months. Some of these were entirely covered with ballast to the depth of four inches, while others were left uncovered. It was found that those which were completely covered decayed most rapidly. The plan of leaving the sleepers uncovered saved ballast, kept the sleepers drier and permitted defects in them to be more easily observed. It was noticed that the sleepers commenced first to rot under the chairs, owing to the retention of moisture at these parts, which might be prevented by tarring the seats. Mr. Bryce stated that sleepers charged with creosote had been sent from England and used on the Madras Railway and were found to answer admirably, and it was suggested that establishments for creosoting the Indian woods for sleepers and tree-nails be erected in convenient positions near the jungles where the timber was obtained. We understand that the creosote, so called, used in England for preserving sleepers, is coal tar, which contains creosote. Mr. MacMaster recommends that unprepared sleepers be tarred under the seats of the chairs, that they be laid in dry ballast raised slightly at the middle, and then sloped off towards the ends to throw the water off. As a vast expense is annually incurred for the renewal of sleepers on our railways such information is instructive so far as it relates to their treatment with creosote.

CONVEYING PETROLEUM IN PIPES.—The project for conveying oil by means of pipes, laid under ground from one point to another, is now being practically tested upon the Tarr farm. A 2-inch pipe is now being laid from Tarville to Plumer, Pa., a distance of about two miles and a half in a straight line. It is proposed to force the oil through this pipe by means of powerful steam engines. The parties concerned are sanguine of success. We understand that Barrows & Co. for some time past have been conveying their oil from the burning well to their refinery, a distance of from 800 to 1,000 feet, and the plan works admirably.—*Exchange.*

THE iron-clad *Sangamon*, now on her way to Fortress Monroe, is provided with a newly invented elastic raft, composed of six india-rubber buoys. These buoys are so constructed that they can be inflated and cast over-board in three minutes, when the raft will be thrown on them, making a space of sixty feet. In case of accident to the vessel the lives of the entire crew can be saved.

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THE SOURCES OF SPRINGS AND RIVERS.

In the interesting communication of a correspondent on another page, the great source of springs and rivers is asserted to be water flowing direct from the ocean to the interior of the earth, thence thrown to the surface by the centrifugal action of the earth's rotation. The sea is compared to a great fountain, and the water channels in the earth to the veins in the human body, supplied from this great reservoir. One argument advanced in favor of this theory is that springs are sometimes found on the tops of hills and mountains which are higher than any of the surrounding country. As it regards the mountains, this is not the case. A few years since we examined the peak of the highest mountain in the range on the east side of the Hudson river at the Highlands, and found no spring there, but there are several springs at lower elevations. The river Nile is cited as an instance to prove the theory, but it militates against it, for the sources of the Nile are among snow-capped mountains in the interior of Africa; these afford perpetual supplies of fresh water. If the source of the Nile had been in Egypt—"the land where no rain falleth"—the theory would have been well supported.

It is also stated that "all waters beneath the surface of the earth have a communication with the ocean." And this is asserted to be "a fact not disputed or even doubted." There is no warrant from science or any good authority for such a statement. The waters of the ocean are salt; those of springs fresh, and it is impossible to transmute the water of the sea by any known mode of filtration unconnected with chemical decomposition. If the ocean supplied our springs with water according to the mode laid down in the communication, the springs would send forth salt water, not fresh. The true source of springs is clouds surcharged with moisture, then condensed on the mountain tops. The heat of the sun evaporates fresh water in the form of vapors from the waters of the great deep; these vapors are carried by atmospheric currents to colder regions, where they are condensed and fall down either in the form of rain or snow. The rains and melted snows percolate into caverns and fissures in the earth's crust, and these are the sources of springs. In other cases they furnish supplies for lakes, swamps and ponds, which afford a constant feed of water to rivers, increasing and decreasing in quantity with the fall of rain and amount of melted snows. We are not acquainted with a single river which has its origin in a region where neither snow nor rain fall. The regions of "no rain" are always barren wastes, unless furnished by water flowing from rainy regions, like those which supply the Nile.

THE WASTE OF COAL.

A pamphlet has been laid before us which proves from facts and statistics compiled by competent persons, that a large portion of the anthracite coal mined in this country is wasted before it is reduced to a merchantable article. The masses of coal are thrown out from the vein by powder, and these must be reduced to the various sizes, such as stove, egg, and nut, before they are marketable; to do this the lumps are thrown into machines which crush and break the masses into pieces of all sizes; these are then assorted by passing through screens whose meshes conform to the standard qualities. The cause of the waste originates with the breaking machinery; it is asserted, that with the best tools now in use, that nearly one-half of all the coal mined is wasted by being smashed into dust, or else so destroyed as to be unfit for use. This is indeed a fearful loss, and mountains of coal dust near the mines assert the truth of the assertion. The coal-mining interest and the community at large are greatly affected by this enormous waste, for it is not to be supposed that the burthen is borne by the capitalists who work the mines—that would be impossible; it is all in the bill, and our fuel costs much more than it would, were it not for the facts above stated. In view of them it seems absolutely necessary that some new and improved machinery for the purpose is required, and we think the inventive genius of our country is fully equal to the task of providing it. We have been furnished with an excellent map of the Lackawanna coal-fields, in plan and section, by a gentleman of this city, Mr. W. Woodman, for which we are obliged.

DISCOVERIES AND INVENTIONS ABROAD.

Slide Valves for Steam Engines.—A patent has lately been applied for by J. Petrie, of Rochdale, England, for an improvement in slide valves, which consists in forming the slide valves of steam engines with cylindrical faces, so that they may be capable of turning upon centers of motion; and the inventor effects this turning by means of tappets or other ordinary apparatus connected to a moving part of the engine. In addition to this rotary motion the valves slide as usual, but, by the first-described arrangement, the steam may be cut off at any part of the stroke. The valves may constitute a portion or the whole of a cylinder, and, in the latter case, he avails himself of the back part thereof for packing, whereby a portion of the steam pressure is removed.

Regulating Watches.—W. Wighton, of Edinburgh, Scotland, has taken out a patent for a mode of regulating watches by a key from the outside of the inner case instead of the common mode of shifting a small inside hand. A toothed quadrant is attached to the ordinary regulator hand, and a fine worm screw gears into the teeth of the quadrant and a spindle carries a click for dividing the shifts of the worm into the teeth of the quadrant. This spindle terminates like the one for moving the hand and the one for winding up the watch, and it is operated by the same key. In this manner the regulator can be moved more conveniently and with greater exactness than by the usual mode.

Coloring Articles of Copper and Brass.—J. Hunt, of Birmingham, England, coats copper and brass articles, imparting to them a bright steel color, with a solution of the bichromate of platinum. The articles are placed in such a solution and a thin film deposited by the galvanic battery in the usual way. If the surface of the article is previously burnished, then placed in the solution of the bichromate of platinum, it assumes a beautiful blue steel tint. The solution used is weak and heated to the boiling point when applied.

Paints from Iron Slag.—The iron slag that is produced in puddling furnaces, when pulverized and reduced to powder, then washed and dried, is employed by A. Warner, of London, as a cheap drier for paints, also as a coarse cheap paint mixed, by itself, with oil. As such slag contains a large quantity of oxide it affords a cheap substitute for litharge (oxide of lead), which is very generally used as a drier for paints.

Bronzing Cast-iron.—The pure copper which is deposited by a galvanic battery, has been found eminently adapted to coat cast-iron figures exposed to the weather. It is put on as a paint, being mixed in a state of powder with oil and then laid on with a brush. The iron balcony which decorates the facade of the Theater Francais in Paris is thus bronzed.

Deodorizing Petroleum.—The following is the substance of the specification of a patent granted to J. W. W. Tindall, chemist, of Liverpool, England, for treating mineral oils:—In those cases where the oils contain paraffine, there is added to the quantity of oil to be treated at the rate of 4 ounces, by weight of commercial sulphuric acid, to each gallon of oil. The sulphuric acid is simply run into the oil contained in a suitable vessel; the oil is then allowed to stand for about ten minutes, when heat is to be applied, so as to raise its temperature to about 115° Fah. This temperature is retained for about ten minutes, when the application of heat may cease, unless the temperature should fall materially during a period of about one hour and forty minutes, the whole of which time the oil is kept well stirred. If the temperature fall then, it is desirable that heat should be again applied, to keep up the temperature as near as may be to the degree above-mentioned. At the end of this time, the oil generally will have ceased to give off any offensive, pungent and choking vapors. If such should not be the case, the stirring is to be continued for a further time, and, if necessary, more acid added, after which one ounce and a half, by weight of nitric or nitrous acid, is to be added to each gallon of oil. The temperature is then allowed to fall to about 105° Fah., and it is kept as near as may be to that temperature for about half an hour, the oil all the time being kept well stirred. A pint and a half of urine is now to be added, and the oil to be stirred and maintained at the temperature of 105° for about half an hour, when, at the rate of one ounce and a half, by weight, of commercial hydrochloric acid is to be introduced, continuing the stirring and the temperature during another hour, at about 105°, at which time, in order to bleach the oil, two ounces of chloride of lime for each gallon of oil is added and stirred in or, in place thereof, one pound of fullers' earth or clay. If the oil is to be immediately distilled, the whole mixture is placed in a still, such as is ordinarily used in distilling such mineral oils and hydrocarbons, and the same is to be distilled in the usual manner. If the oil is to be stored or to be sent to a distance, without first undergoing distillation, it should be well washed in water, prefering for this purpose sea-water; after which, the oil is to be placed in suitable casks, and may be used in this state for some purposes. When treating like mineral oils and hydrocarbons which do not contain paraffine, it is found desirable to increase the quantity of chloride of lime to four ounces, by weight, to each gallon of the oil, and four ounces of animal charcoal are stirred into each gallon of oil, and allowed to remain half an hour before applying the nitric or nitrous acid, as above explained; in other respects the process is adopted as above described.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Galvanizing Wire.—This invention is more especially intended for galvanizing skirt hoop or crinoline wire. The wire, after having been annealed, has to be cleaned by acid before it can be subjected to the galvanizing process. The improvement consists in rendering the processes of annealing, cleaning and galvanizing continuous by running the wire in a heated state from the annealing oven directly to and through the cleaning trough, and thence to and through the galvanizing trough, winding it off one reel into the oven and on to another from the galvanizing trough. The inventor is George Bedson, of Manchester, England. The claim (dated Feb. 17, 1863) appeared in our last week's issue.

Globe and Chimney for Lamps.—This invention relates to a new and useful combination of a globe and chimney for coal-oil lamps. The invention consists in having the chimney made in a form approximating to an oblate spheroid and provided at its lower part with a neck of such dimensions that it will incompass the jacket of the burner, and form an external draught passage for the same, while all of the flame will be in the spheroidal part of the chimney, which leaves an air space of equal width all around the flame. The invention also consists in having the chimney at one side ground and at the other side plain or smooth, so that by simply turning the lamp the rays of light may be transmitted through either the plain or ground surface as may be desired. The inventor of this improvement is E. B. Requa, of Jersey City, N. J.

Revolving Shelf.—The object of this invention is to obtain a simple and economical method of constructing rotary shelving for household purposes, so that the device may be afforded at such a small cost as to be within the reach of all classes of the community, and be capable of being packed closely to facilitate and reduce the cost of transportation. This device is the invention of Silas Vernoy and Nicholas Overfield, of Meshoppan, Pa.

Three-leaved Sights for Fire-arms.—The object of this invention is to provide for the convenient adjustment of the joint of the sight and the tightening of the same after it has become loosened by wear; and to this end it consists in slitting the base and one of the leaves of the sight, in such a manner and so applying the joint pin in combination with them that the several parts of the joint can all be tightened up simultaneously and uniformly by screwing up the said pin. James Warner, of Springfield, Mass., is the inventor of this device.

THE Detroit *Tribune* says quite a number of oil wells in Canada have "suspended issue" and "dried up."

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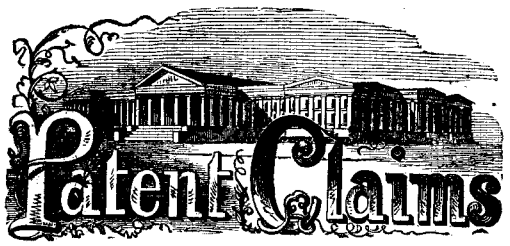

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 24, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,728.—Manufacture of Carpet Lining.—S. M. Allen, Boston, Mass.:

I claim the improvement in the manufacture of fabrics for underlaying carpets, &c., the same consisting in permanently combining with or forming upon soft sheets of felt of any desired thickness a smooth and compact facing of paper or other similar surface, substantially in the mode hereinabove described.

37,729.—Fence.—B. F. Allison, West Dayton, Iowa:

I claim, first, The arrangement of the double-shouldered recess, d, and recesses, d*, in the clamp, D, in combination with mortises, f, in the end battens, a*, and with secondary battens, a'*, and keys, h, all constructed and operating substantially in the manner and for the purpose shown and described.

Second, The employment or use of a clamp, E, with central recess, e, in combination with mortises, g, in the end battens, and with secondary battens and keys, i, all as and for the purpose specified.

[The object of this invention is to produce a light and durable fence which can be easily put up or taken down, and it relates to an improvement in that class of fences the panels of which are arranged in a zig-zag line, and which are commonly termed worm fences.]

37,730.—Churn.—Charles L. Bottum, Dansville, N. Y.:

I claim, first, The use of the angular dasher B, as seen in Fig. 1, and its various modifications, as shown in Figs. 2 and 3, with or without the adjustable rod, f, substantially as set forth and for the purpose described.

Second, I claim the use of the angular dasher, B, with its modifications in combination with the rod, f, the adjustable standard or fulcrum, D, the lever, C, and the churn, A, substantially as described.

37,731.—Feed-water Heater for Steam Boilers.—Richard C. Bristol, Chicago, Ill.:

I claim, first, The combination of plates perforated to a greater or less extent over their surface, with shell or case of feed-water heaters of steam generators or boilers, for the purpose set forth.

Second, The combination of the bent tube, or its equivalent, with a feed-water heater of steam generators or boilers, for the purpose set forth.

Third, The combination of the well-bent tube and feed-water heater of a steam generator or steam boiler, substantially as and for the purpose set forth.

37,732.—Elevating Mill-stones.—A. M. Bruckart, Brunnersville, Pa.:

I claim the screw, H, provided at its lower end with two oppositely projecting hooks, c c, bevel wheel, F, pinion, G, and winch, J, in combination with the metal cap, f, stud shaft, g, horizontal arm, A, and hooks, d d, when the whole is arranged to operate in the manner and for the purpose specified.

[The object of this invention is to obtain a simple device to facilitate the operation and to lessen the time and labor necessary to the handling of millstones preparatory to the operation of re-dressing or re-sharpening their cutting surfaces. The invention consists in a certain combination of parts whereby the above-mentioned results are effected in a most satisfactory manner.]

37,733.—Water Wheel.—N. F. Burnham, York, Pa.:

I claim the ring, D, provided with the flange, i, and arranged in relation with the opening, h, the scroll and rim, f, of the wheel, to operate as and for the purpose herein set forth.

[This invention relates to an improvement in that class of water wheels which are placed on a vertical shaft, are enclosed within a scroll and discharge the water at the center, and which are commonly termed center-discharge wheels. The object of the invention is to afford a free or unobstructed passage of the water through the wheel, so as to avoid or prevent all re-action, and also to prevent the wearing of the bottom of the scroll and consequent leakage by the action of the wheel.]

37,734.—Calash or Folding Top for Carriages, &c.—Ira Cogswell, Jr., Earlville, Ill.:

I claim the combination of the inclined arms, E E, hooks, K, and folding bars, F F, with the bars, I J, bows, G G' G'' G''', and seat, B, all in the manner herein shown and described.

[This invention consists in constructing the top of a carriage in such a manner that it may, when not required for use, be folded down compactly, and be entirely out of the way so as not to interfere in the least with the view of the occupant of the seat, and also be capable of being unfolded or raised to a greater or less degree, as occasion may require.]

37,735.—Cellular or Tubular Boiler for Evaporating Pans.—D. M. Cook, Mansfield, Ohio:

I claim, first, A cellular or tubular boiler, substantially as described, adapted for application to a shallow evaporating pan, substantially as described and for the purpose set forth.

Second, The combination of a boiler with deep cells or tubes, a furnace and a shallow evaporating pan, substantially in the manner described.

Third, Constructing the cellular or tubular boiler with cooling or extending sides; and also applying it to the throat of a furnace, substantially in the manner and for the purpose set forth.

37,736.—Evaporating Pan with Cellular Boiler.—D. M. Cook, Mansfield, Ohio:

I claim, first, A cellular boiler and a shallow evaporating pan united substantially in the manner and for the purpose described.

Second, The arrangement of the directors, d d d' d', in combination with the cellular boiler and shallow evaporating pan, substantially as and for the purpose described.

37,737.—Evaporating Pan with Tubular Boiler.—D. M. Cook, Mansfield, Ohio:

I claim, first, A shallow evaporating pan constructed with a deep boiler, when the boiler is divided into cells by means of tubes which form flame flues, substantially as herein described.

Second, The arrangement of the directors, d e, with respect to the combined boiler and shallow evaporating pan, substantially as and for the purpose described.

37,738.—Support for Artificial Legs.—Phylander Daniels, Le Roy, N. Y.:

I claim the shoulder saddle, C, provided with friction rollers, c c, over which passes the strap, D, secured at its ends to the artificial limb, for the purpose of suitably supporting the same and allowing the free and easy motions of the body, arranged, combined and operating substantially as herein set forth.

37,739.—Clothes-dryer.—Daniel M. Devoe, New York City:

I claim the arrangement of the semi-circular slotted case, A, provided with springs, e, on top, and with a continuous stop, h, or its equivalent, on the bottom, in combination with a series of radial folding bars, b, all constructed and operaring in the manner and for the purpose shown and described.

[This invention consists in the arrangement of a semicircular-slotted case provided with springs or spring-catches on top, and with a continuous semicircular stop, or with a series of stops at the bottom, in combination with a series of radial folding bars in such a manner that, when said bars are turned up, they are perfectly protected against dust or other impurities, and they are retained by the spring catches and prevented from turning down spontaneously, and that one or more of said bars can be turned down and used for drying clothes whenever it may be desired.]

37,740.—Plow.—James M. Dick, Buffalo, N. Y.:

I claim the combination of the curved iron beam, F, attached to the landside, E, as shown and described, with the mould board, D, and the share, A, or cutting part of the plow, when the whole are constructed and arranged as herein described and set forth.

37,741.—Beehive.—James Donnel, Davenport, Iowa:

I claim the drawer, C, made in the manner described and arranged in relation to the hive and comb frame, as set forth, so as to ventilate the comb, and, at the same time, exclude the light therefrom and catch the refuse from the hive.

37,742.—Pack Saddle.—Jacob Dunton, Philadelphia, Pa.:

I claim, first, A pack saddle consisting of two disconnected bars or pads, C C, attached respectively to two cases or panniers, A A', connected together by any suitable means, substantially as herein described and for the purposes set forth.

Second, The combination of the two panniers or cases, A A, connecting links, B B', and upper case, A'', when the whole are constructed and arranged in the manner herein shown and described, so that the connecting links of the lower cases shall serve to prevent longitudinal displacement of the upper one, as explained.

Third, The pockets, D D', in the described combination with the cases or panniers, A A', and bars, C C', for the purpose explained.

[The leading feature of novelty in this invention is the application of a pad or saddle bar to a pannier or cases of any suitable form adapted to be slung in pairs across an animal's back.]

37,743.—Cotton Gin.—Francois Durand, Paris, France. Patented in France July 18, 1862:

I claim, first, In combination with the feeding rolls and brush, the carrying and crushing rolls, i i', for taking the cotton from the feed rolls to the brush, and at the same time crushing the seed therein, substantially as described.

Second, I claim, in combination with the traversing and rotating carrying rolls, i i', the intermittently-feeding rolls, f f, so that while the rolls, i i', are not receiving cotton, the feed rolls shall be in a state of rest, substantially as described.

Third, I claim, in combination with the traversing and rotating rolls, i i, the drum, k, and revolving beaters or blades, t, made and operating together substantially as described and for the purpose set forth,

37,744.—Stock Pump.—Warren A. Durrin, Milledgeville, Ill.:

I claim the combination of the inclined endless apron, A A, and frame, B B, in connection with the governor, D D, and brakes, R and S, and the pitman, F, when applied to operate a pump, as and in the manner delineated and specified.

37,745.—Apparatus for Cooking with Gas.—Warren L. Fish, Newark, N. J.:

I claim, first, The herein-described gas-heating and cooking apparatus, the same consisting essentially in the combination of a cylinder, or its equivalent, closed at the bottom by a perforated plate, and surrounding one or more jets of gas, as shown, with a chimney arranged to operate substantially in the manner and for the purposes set forth.

Second, In combination with the cylinder surrounding the flame or flames, perforated bottom and chimney, I claim the making of the said cylinder of a transparent material, or providing it with one or more windows, substantially in the manner and and for the purposes set forth.

Third, I also claim, in combination with the cylinder surrounding one or more flames, and closed at the bottom by a perforated plate, as described, of a heating vessel with a central flue, so shaped as to constitute the chimney to operate substantially as and for the purposes set forth.

37,746.—Composition for Lubricating Wagon Axles, &c.—James P. Gay, Cincinnati, Ohio:

I claim the improved wagon tar herein described, consisting of the ingredients specified, combined substantially in the manner and in the proportions herein stated.

37,747.—Bung Socket and Plug for Barrels.—Stephen J. Geoghegan and William Ulmer, New York City:

We claim the socket, A, and plug D d', adapted to apply to the stave C, and to sink even with the exterior surface thereof, substantially as and with the effect herein set forth.

37,748.—Suspended.

37,749.—Mode of operating Weather Strips.—James B. Gray, Hudson, Wis.:

I claim the combination of the eccentric, g (whether used on one or the other, or both jambs of the doorway), with the strips, c and a, by means of the rod or wire, k, substantially as and for the purposes hereinbefore set forth.

Second, I also claim the washer, m, in combination with the eccentric, g, made, constructed and used as and for the purposes herein set forth.

37,750.—Gang Plow.—Jacob Haege, Shiloh, Ill.:

I claim, first, The attaching of the plow beam to the axle, A, by means of the stirrup or loop, Q, pin, S, and chains, d' d', and bar, T, and wooden pin, e', in combination with the lever or treadle, J, all arranged as shown, whereby the plow or plows may be readily raised above the surface of the ground when necessary, and the beam allowed to become detached from the axle or carriage when the former comes in contact with any obstruction which may lie in their path.

Second, The rotary cutters, I, when placed on a screw-rod or shaft, H, and secured thereon by jam nuts, i, and said shaft hung in the arms, G G, substantially as and for the purpose specified.

Third, The combination of the bar, Z, cutter, B', when applied to the subsoil plow, X, and used in connection with a gang plow for the purpose set forth.

[This invention relates to an improved gang plow designed more especially for western or prairie use. The invention consists in an improvement in attaching the plow beams to the moving gear or carriage whereby the plow, when necessary, may be readily elevated by the driver above the surface of the ground, and the plow rendered capable of being detached from the carriage in case of the plow coming in contact with an obstruction of any kind, thereby preventing the breaking of any of the parts, or the causing of them to be subjected to any undue strain.]

37,751.—Sugar Evaporator.—Robert Hamilton, Franklin, Ind.:

I claim, first, The arrangement of first and final boiling pans, B C C D and F, chimneys G and H, and damper, I, substantially as and for the purposes set forth.

Second, The described arrangement of hinged and removable final boiling pan, F, and supporting rack, M.

37,752.—Portable Book-case.—Ezra Haskell, Canton, Mass.:

I claim the series of removable shelves, C D, &c., composed of pieces, b c d, which, when two shelves are placed together form a box as represented in Fig. 6, in combination with the folding sides, A B, substantially as described.

37,753.—Seeding Machine.—George D. Haworth, Decatur, Ill.:

I claim the scrapers, P P, when attached to a sliding bar, O, arranged as shown, to admit of the scrapers being passed laterally over the surfaces of the wheels, C, when necessary, and not be in contact with the latter when not desired for use, as herein set forth.

[This invention consists in the employment of a rotary coulter arranged with a nose-piece on the furrow shares in such a manner that weeds and other obstructions which may be in the path of the furrow shares may be readily passed over and not allowed to collect around the shares, and prevent the discharge of seed therefrom. The invention further consists in the employment or use of scrapers applied to the machine and arranged in such a manner that the wheels on which the machine is mounted may be readily cleaned and the scrapers applied to the wheels only when necessary.]

37,754.—Corn Planter.—C. W. S. Heaton, Belleville, Ill.:

I claim, first, The employment of two alternating slide valves, in connection with separate channels, substantially as and for the purpose set forth.

Second, The arrangement of the holes in the valves and the arrangement of the tubes, on a rhomb instead of a square, for the purpose set forth.

Third, The combination of the tooth or share, two valves and a series of tubes or channels, substantially as and for the purpose set forth.

Fourth, The employment of weight boxes in connection with a coverer, the whole constructed substantially as and for the purpose described.

Fifth, The arrangement of the devices above claimed in connection with the frame, A A, goose-neck lever, slotted rockshaft, all constructed and operating substantially as and for the purpose described.

37,755.—Board Measure.—Austin D. Hoffman, Bellville, Mich.:

I claim the dial wheel, B, having several circles differently graduated, in combination with the indices, E, and several scales or columns of figures, all arranged to measure different lengths of lumber, substantially in the manner and for the purpose set forth.

37,756.—Percussion Fuse for Shells.—B. B. Hotchkiss, Sharon, Conn.:

I claim a percussion hammer or striker constructed substantially as herein described, having a hard exterior and a soft interior and base, for the purpose specified.

37,757.—Driving Power for Spinners.—M. G. Hubbard and A. J. Smith, Syracuse, N. Y.:

We claim the construction and arrangement of the parts in such manner as to increase the pressure on the shaft, C, by its own resistance and the driving power operating together, for the purposes substantially as set forth.

37,758.—Gold-miners' Washing Pan.—Thomas Kendall, Sen., San Francisco, Cal.:

I claim the pocket, e, as formed and made by pans, A and D, and coupling, G, with its parts, F and O, and packing, v, with screw, Z, in combination, as constructed and arranged and substantially described therein.

37,759.—Apparatus for determining the Form and Size of the Head and adapting the Hat thereto.—J. F. Klein, Trenton, N. J.:

I claim a composition constructed substantially as described, to wit, so that it can be used to take the form and size of the head, and then put into a hat to shape it (the hat) to fit the head.

37,760.—Fancy Looms.—L. J. Knowles, Warren, Mass.:

I claim operating the heddles by means of cranks capable of being turned independently of each other to the opposite extremes of their throws, as indicated by the pattern chain, or its equivalent, substantially as described.

I also claim operating movable shuttle-boxes by means of cranks so arranged as to be turned independently of each other from one extreme of their throws to the other, under the direction of a pattern chain or its equivalent.

I also claim the rotating lifter and depresser cylinders, operating as set forth, for the purpose described.

I also claim the crank wheels, c c2, constructed and operating substantially as described for the purpose specified.

I also claim the gear, k, and segmental gear wheel, h, in combination with a rotary lifter and depresser cylinder, for the purpose set forth.

I also claim the cam, s, upon the shaft of the wheel, k, in combination with the ledge, r, upon the segmental gear, h, for the purpose described.

I also claim loosening up the harness cords by means of the vibrating guide rolls, or their equivalents, for the purpose described.

I also claim connecting the drop box with the mechanism by which it is operated by means of a cord and pulley, substantially as described.

37,761.—Pie Stamp.—Herbert Marshall, Dracut, Mass.:

I claim the combination and arrangement of the revolving handle, A, with the crimping wheel, C, and curved lever guide, E, in the manner hereinbefore described and represented in the accompanying drawings.

37,762.—Clothes Frame.—J. P. Mayhugh, Leitersburgh, Md.:

I claim, first, The use of downwardly-folding arms in combination with yielding hinges, f', operating in the manner described, to adapt the arms to fold within a smaller space.

Second, The combination of the slides, E, with the side plates, C, and arms, F, substantially as and for the purposes set forth.

Third, The general combination of the center post, A, side plates, C C', and downwardly-folding arms, F F' F'', when constructed, arranged and operating in the manner and for the purposes specified.

[The peculiar features of this invention are, that it affords, when in use, a large area for hanging clothes, without being elevated to an inconvenient hight at any part, and, when not in use, folds into a very compact form.]

37,763.—Puzzle.—J. U. Mueller, Detroit, Mich.:

I claim the employment or use, in a puzzle, of two different sets of triangles, A B, which are of such a shape that two sides of each triangle of one set are equal to two sides of each triangle of the other set, and the three angles of each triangle are different from each other, and the angles of the triangles of one set are different from those of the other set, substantially as and for the purpose herein shown and described.

[This invention relates to that class of toys in which, by means of several pieces of wood of different colors and different shapes, a variety of figures or designs can be formed.]

37,764.—Breech-loading Fire-arm.—Charles Perley, New York City:

I claim the swinging breech or chamber, d, in combination with the tapering sleeve, g, and breech supporter, b, substantially as and for the purposes specified.

And in combination with the foregoing, I claim the adjusting screw, l, hemispherical or conical projection, m, and the inclined lug, k, for the purposes and as set forth.

37,765.—End-thrust Bearing.—Charles Perley, New York City:

I claim the collar, d, and balls, i i, arranged and applied as set forth, to take the end thrust of the propeller shaft, as specified.

37,766.—Traveling Battery.—Charles Perley, New York City:

I claim the traveling battery specified, provided with the V-shaped end, e, and inclines, e', as set forth.

I also claim the arrangement of the movable platform sections, h, as and for the purposes specified.

And I claim providing the movable platform sections, h h, with the rails, 4, 4, for the purposes and as set forth.

37,767.—Hose Coupling.—Charles Perley, New York City:

I claim a hose coupling having the hinged clasp, c d, fitted with the screw, f, and receiving the flanges, 1, 2, in the manner and for the purposes set forth.

37,768.—Steering Apparatus.—Charles Perley, New York City:

I claim the arrangement of the horizontal shaft, g, pinion, k, and wheel, f, within and sustained by the casing, c, as and for the purposes set forth.

I also claim the horizontal wheel, f, in combination with the rud-

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der stock, when fitted substantially as specified, so that the rudder is free to work endwise without disturbing or altering the position of the wheel, f, as set forth.

37,769.—Ram for the destruction of the Enemy's Ships.—Charles Perley, New York City :

I claim, first, The stop-cock or cocks, d and e, applied at the end of the vessel below the water line in combination with the movable ram, a, for the purposes and as specified.

Second, I claim the circular cutting edge and the cannon applied to and combined with the movable ram, in the manner specified, so that said cannon can be loaded when the ram is drawn into the vessel, or a new cutting edge substituted, as specified.

Third, I claim the ram fitted to slide in the opening in the vessel through which it is projected, in combination with the weighted box, h, contained in the vessel, but not attached thereto, for the purposes and as specified.

37,770.—Closing Doors.—Charles Perley, New York City :

I claim the saddle piece, i, receiving the weight cord, in combination with the rollers, e e′, and acting to close the door, in the manner and as specified.

37,771.—Discharging Explosive Shells from Balloons.—Charley Perley, New York City :

I claim the employment of a divided basket or receptacle, sustained by a gas bag, and carrying the bomb or other article to be dropped by the opening of said basket, as set forth.

I also claim the employment of the hinge pin, e, and barrel, f, to disconnect the halves of the basket by firing out the said pin, e, as set forth.

And I claim a bomb shell, or its equivalent, attached to and conveyed by a gas bag, in combination with automatic means for disconnecting the said bomb at a given time, as set forth.

37,772.—Ventilator.—T. T. Prosser, of Fond du Lac, Wis. :

I claim a ventilator constructed by cutting out suitable orifices in a pane of glass or other transparent substance and applying thereon a movable disk of a similar transparent material, in the manner substantially as set forth.

37,773.—Combination of Globe and Chimney for Lamps.—E. B. Requa, Jersey City, N. J. :

I claim the combined globe and chimney composed of the oblate spheroidal part, a, and the conical neck, b, so arranged that it may be applied to the burner and have the relative position to the jacket and cone thereof and to the flame, as herein set forth.

I also claim having one side, f, of the part, a, of the globe and chimney ground, and the other side, g, plain or unground, as specified.

A further claim, forming the upper part of the neck, b, of the globe and chimney with a circumferential sunken portion, a′, but this I only claim when used with the particular form of globe and chimney, as herein described.

37,774.—Button.—P. E. Richardiere, Paris, France :

I claim a button having formed, in its interior, one or more bars or partitions, over which the thread passes, substantially as herein described, to secure it to the cloth or other material without being exposed on the face of the button.

[This invention consists in a button having formed in its interior one or more bars or partitions over which the thread, by which it is attached to a garment or other article, passes without being exposed on the front of the button. This button may be made of porcelain, horn, india-rubber or any material which is plastic under some conditions and capable of being molded or shaped, or it might be made of metal in one piece or of two soldered or otherwise secured together.]

37,775.—Cultivator.—E. H. Sawyers, West Grove, Iowa :

I claim the main frame, C, guide rod, G, metallic support, J, levers, H I, rods, a a, plow frame, F, and spindle, j, the whole combined and arranged to operate in the manner and for the purpose specified.

[This invention relates to an improved machine for cultivating those crops which are grown in hills or drills, such as corn, potatoes and the like, and it consists in a novel arrangement of devices whereby the most perfect control over the plows is afforded the driver, enabling him to guide the machine so as to follow the sinuosities of the rows and to cultivate with equal facility and efficiency on both sides of straight or crooked rows.]

37,776.—Seeding Machine.—U. H. Shockley, Litchfield, Ill. :

I claim the combination, in the manner herein shown and described, of the shaft, I, toggle, H, the seed slides, G G, and lever, A′, with the shaft, D, hoppers, C, supporting wheel, B, pulleys, c c, and frame, A, all as herein set forth.

[This invention consists in operating the seed-distributing apparatus by a rotary movement only, whereby an exceedingly simple and efficient device is obtained for sowing seed either in drills, hills, or check-rows.]

37,777.—Shirt Stud and Sleeve Button.—Henry Simon, Providence, R. I. :

I claim the improved stud or button described, composed of a shell of sheet metal with a backing of enamel, the whole article being substantially such as specified.

37,778.—Cooking Stove.—D. L. Stiles, Rochester, N. Y. :

I claim the flue plates, b b and d d, conjoined at the bottom but diverging toward the outer corners at the top of the oven, so that the heated air, in equal columns, is concentrated at those corners as it rises, in combination with the interior flue plates, f f, and movable division plates, b b, in elevated oven stoves, for the purpose of equalizing the heat throughout the same, substantially as set forth.

I claim the arrangement of the loose perforated thimbles, k, in combination with the stationary heated air tube, i, substantially as and for the purposes shown and described.

37,779.—Mosquito Frame.—L. S. Thompsen, Brooklyn, N. Y. :

I claim an expanding mosquito frame formed of bars fitted so as to be increased or decreased in length to fit the window, and receiving the netting or gauze, and in combination therewith I claim the joint at the angles for the purposes specified.

37,780.—Revolving Shelf.—Silas Vernoy and Nicholas Overfield, Meshoppan, Pa. :

I claim the post, A, notched or recessed, as shown, and having the side strips or boards, c, secured to it, in combination with the slats, B B′, all arranged as shown, to form a new and improved article of manufacture, for the purpose specified.

37,781.—Draught Regulator.—Henry C. Turner, Boston, Mass. :

I claim the combination of the register, D, the damper, E, and the division plate or partition, G, operating as set forth, for the purpose described.

37,782.—Sight for Fire-arms.—James Warner, Springfield, Mass. :

I claim the combination of the screwed joint pin, the slit, b, in the base, A, and the slit, g, in the leaf, B, substantially as herein described, whereby the screwing-up of the pin is caused to tighten all parts of the joint.

37,783.—Hook for Fastening Garments.—G. A. Watkins, Springfield, Vt. :

I claim a fastening for india-rubber and other blankets and garments designed for military and army use, composed of a hook and an eyelet attached permanently to the shank, a, substantially as herein shown and described.

[This invention consists in attaching a hook to the blanket or garment by means of an eyelet, whereby a simple and efficient fastening is obtained.]

37,784.—Sleeve Button.—Wm. H. Wilson, Providence, R. I. :

I claim the combination of the two posts, a b, the bar, B, moving in a plane parallel with the head of the button, the elastic arm, C′ and the projection, f, the whole operating substantially as herein specified.

[This invention consists in a certain novel arrangement of a bar in combination with two projections on the back of the head of the button, and certain means of fastening the said bar, whereby it is made to secure the button in the waistband without the necessity for having the edges overlap each other, and provision is made for inserting a glass in the back of the button if desired.]

37,785.—Money Safe for Travelers.—J. A. Engelhard (assignor to himself and George Hartman), St. Louis, Mo. :

I claim the safe, A, with its pockets, B D E, and straps, g k or m n, all being constructed and arranged substantially as and for the purposes specified and represented, as a new article of manufacture.

37,786.—Hydrant Valve.—J. W. Guernsey, Tioga, Pa., assignor to himself and H. A. Guernsey, Wellsborough, Pa. :

I claim the employment of the double-way cap, E, constructed as set forth, in combination with the perforated disk valve, J, stem, H, and chamber, A, all in the manner herein shown and described.

37,787.—Coupling Head for Railroad Cars.—Robert M. Hughes, Oxford, Pa., assignor to J. A. Blake and H. Wood, Philadelphia, Pa. :

I claim, first, The combination of the coupling head, A, and link, D, when the latter is permanently connected to the former by the hooked projection, i, and pin, m, or their equivalents, and when the head is so formed in respect to the link as to allow the same to be raised or lowered, the whole being constructed substantially as and for the purpose herein set forth.

Second, In combination with the said coupling head, A, and link, D, I claim the catch lever, B, hung to the head and arranged and operating substantially as and for the purpose specified.

37,788.—Ice Calk.—Daniel Krauser (assignor to himself, H. P. Stichter and L. C. Thompson), Pottsville, Pa. :

I claim the heel frame, A, in combination with the flat plate, C, when the latter is so attached to the former and arranged in such relation therewith as to admit of being placed directly beneath the heel when the spurs or points, f, are required for use, and admit of being turned over into the hollow of the sole when not required for use, substantially as shown and described.

[This invention consists in having a series of spurs attached to a plate which is connected by a joint to a frame or clamp so constructed that it may be readily attached to the heel of a boot or shoe, said frame or clamp having a spring attached to it and all so arranged that the plate which is provided with the spurs will be capable of being turned over on the heel, and the spurs serve as footholds, and the plate, when the spurs are not required to serve the above office, be capable of being turned over in the hollow of the sole, so that the spurs will be entirely out of the way. For information respecting this invention address the assignees, Messrs. Stichter & Thompson, Pottsville, Pa.]

37,789.—Cultivator.—P. B. & L. C. Reynolds (assignor to themselves and Clark G. Reynolds), Prophetstown, Ill. :

I claim, first, The arrangement upon adjustable beams, B C, of two or more pairs of perforated lever adjusting plates, H h i, for the purpose of adjusting two or more pairs of shovel stocks, G1 G2 t t, in the manner and for the purpose described.

Second, The arrangement of the bent sustaining bars, F F, side beams, B C, and slots, b c s s, in the manner and for the purpose described.

Third, The arrangement of the frame, A B C D E, swingle tree, I, draft rods, J J, adjustable hangers, K K, perforated lever adjusting plates, H H H H, swivelling square or flat top standards, G1 G2, bent sustaining bars, F F, and slots, b c s, the whole constructed and operating together in the manner and for the purposes described.

37,790.—Machine for Planishing Paper.—John F. Schuyler (assignor to Wm. E. Lockwood), Philadelphia, Pa. :

I claim the use of the smooth planishing roller, E, in combination with the pressure roller, D, when a number of small longitudinal ridges are formed on the latter roller as set forth for the purpose specified.

I claim the auxiliary pressure roller, K, of the form described in combination with the upper and lower rollers, D and E, for the purpose specified.

37,791.—Device for Feeding Paper to Cutting Machines.—John F. Schuyler (assignor to Wm. E. Lockwood), Philadelphia, Pa. :

I claim the clamp composed of plates, D and E, the cam lever, G, or its equivalent and the pawl, F, the whole being constructed substantially as set forth, and operating in conjunction with a rack, B, as specified.

37,792.—Apparatus for Bending and Folding Paper Collars and other articles of apparel.—John F. Schuyler (assignor to Wm. E. Lockwood), Philadelphia, Pa. :

I claim, first, A trough, Y, to which steam is admitted, in combination with the endless traversing tapes, x x, the whole being arranged and operating substantially as set forth for the purpose specified.

Second, The roof, W, with its lining, y, of oiled silk or its equivalent, when arranged in respect to the trough, Y, and endless tapes, x, substantially as and for the purpose set forth.

Third, I claim the registering arms, T, or their equivalents, when arranged in respect to and operating in conjunction with the endless tapes, substantially as set forth for the purpose specified.

Fourth, The combination of the bar, n, shaft, H, with its pulleys; the endless tapes, x x, and adjustable ledge, 7, the whole being arranged and operating substantially as set forth for the purpose specified.

Fifth, I claim the reciprocating blade, J, adjustable ledge, 7, folding rolls, F and G, and table, 4, the whole being arranged and operating as and for the purpose herein set forth.

37,793.—Grinding Mill.—Amos H. Searfoss (assignor to Anna Marie Hyde), Newark, N. J. :

I claim constructing a vertical mill with its bed stone secured, and held to the frame work in the manner described; combined with a feeding screw, and feeding apparatus arranged, constructed, and operated as described.

37,794.—Steam Gage.—Thomas Shaw (assignor to himself and Philip F. Justice), Philadelphia, Pa. :

I claim an apparatus when arranged substantially as set forth and for the purpose specified.

37,795.—Steam Boiler.—Samuel Steinmetz (assignor to Andrew Riersen), Chicago, Ill. :

I claim, first, A steam boiler, constructed with a known portion, D, of its exterior surface or shell, more yielding than the remainder, for the purpose of carrying off any excessive pressure which can possibly occur, the said yielding portion being held and controlled substantially as herein explained so as to be automatically released when raised from its seat and thus prevent disastrous consequences from an explosion.

Third, The combination of the yielding head, D, levers, I1 I2 I3 I4, spring hooks, J1 J2 J3 J4, and returning spring, H, all constructed, arranged, and operating substantially as herein shown and described.

[This invention does not take the place of the common safety valve, but effectually prevents explosion in the event of an increase of pressure too great or sudden for the safety valve to relieve.]

37,796.—Grinding Mill.—Awsbent H. Wagner (assignor to himself and Chas. Kaestner), Chicago, Ill. :

I claim the peculiar construction of the vibrating frame, M, having four bearings by which means the stationary stone, I, can adjust itself vertically and horizontally to the running stone.

I claim the pivots, J J, grooves, K K, for holding the stone, I, when combined with my devices for holding and shaking the shoe, R, and the floats or agitators, V V, arranged and operating as described.

37,797.—Snow-scraper.—Joel Hood, Milwaukie, Wis. :

I claim, first, The combination of the scraper, E, having a tongue or projection, F, with the standard, A, attached to a frame, B, by a pin, C, and springs, M M, and I, and connecting rods, O O, as and for the purpose herein set forth.

Second, I claim the stirrup, L, in combination with the devices or means recited in the above first claim, as herein described.

RE-ISSUES.

1,415.—Yellow Metal Nail or Spike.—Samuel L. Crocker, Taunton, Mass. Patented April 17, 1849. Re-issued Aug. 1, 1854 :

I claim the new article of manufacture herein above described, viz: a yellow metal nail or spike, made by the combined processes of heating the metal to redness, and in such state cutting and heading it in a nail machine and subsequently treating it substantially as described; meaning by the term yellow metal, a metal composed of copper and zinc, in the proportions in which they are usually combined in the manufacture of the well-known "Muntz sheathing metal."

1,416.—Burning Fluid.—Levi L. Hill, New York City. Patented June 16, 1858 :

I claim, first, The use of caoutchousine for imparting greater volatility, as well as greater stability to my compounds. I wish to be distinctly understood as claiming the use of caoutchousine only in combination with the liquids herein described.

Second, I claim as my invention the liquids herein described as Nubian oils, A B C D, having the composition and properties set forth, to be used singly or in such relative proportions and admixture as may appear necessary to accomplish the purposes set forth.

Third, I claim passing a current of atmospheric air over or through the described mixtures or their equivalents of hydro-carbons, fluid and more or less volatile or rendered so, by the mixture or by the application of heat and using the mixture of air and the vapors of the hydro-carbon for producing light or heat or both.

1,417.—Carbureting Air.—Levi L. Hill, New York City. Patented Dec. 20, 1859 :

I claim, first, Charging air with hydro-carbon vapor by means of an apparatus composed of a vaporizing vessel, bellows or blower, air receiver, induction and eduction pipe, in combination with an independent air pipe substantially as shown and described.

Second, Combining a current of atmospheric air direct from a bellows or blower and capable of being regulated as to pressure and quantity, with another current of air that has been passed over or through a more or less volatile hydro-carbon fluid and utilizing by combustion the mixture of air and hydro-carbon vapors thus formed for generating light or heat or both.

1,418.—Pans for Evaporating and Purifying Saccharine Juice.—Cornelius Jacobs, Columbus, Ohio. Patented Aug. 6, 1861 :

I claim, first, An evaporating pan with transverse partitions operating substantially as described.

Second, Making the partitions adjustable substantially as and for the purpose described.

Third, The specified construction of the lower edge of the partitions for the purpose set forth.

Fourth, The adjustable sirup-discharger in combination with an evaporating pan, substantially as set forth.

1,419.—Inkstand.—Orlando K. Jadwin, Carbondale, Pa., Patented Nov. 23, 1858 :

I claim, first, Supplying ink to the pen-cup of an inkstand solely by means of the pressure of the bottom of a plunger upon the ink to be supplied in said cup.

Second, I claim a closely fitting plunger, c, in combination with a well or chamber, b, substantially as and for the purpose set forth.

Third, In an inkstand the pen-cup of which is charged by the pressure of the bottom of a plunger upon the ink to be supplied to said cup, I claim forming the bottom of such plunger with a cavity substantially as and for the purpose set forth.

Fourth, I claim so applying an ink or pen-cup to the plunger of a fountain-inkstand, that when the pen-cup is charged with ink, the ink will remain therein, though the plunger be elevated out of the bowl of the inkstand.

1,420 (A.)—Car Spring.—Richard Vose, New York City. Patented March 11, 1862 :

I claim the combination or interposition of a packing of elastic gum or its equivalent between the coils of a spiral or helical metallic spring substantially in the manner and for the purpose herein set forth.

1,421 (B.)—Car Spring.—Richard Vose, New York City. Patented March 11, 1862 :

I claim the use of longitudinally indented, grooved, or channeled, metallic rods or bars, when formed into spiral or helical springs, of substantially the shape herein represented and described.

1,422.—Cotton Gin.—Mary Jane Brown, Brooklyn, N. Y., admistratrix of the estate of Hiram W. Brown, deceased, late of Mellville, N. J., and assignor to herself and Jeremiah Johnson, Jr., and Franklin H. Lummus, Brooklyn, N. Y., and Theodore Bourne, New York City, the assignees of said decedent. Patented March 23, 1858 :

I claim, first, The arrangement of the pressure plate and of the stripping plate in their relation to the grating of the feed-board, substantially in the manner and for the purposes set forth.

Second, The employment in combination with the roller, B, stripping plate, L, and pressure plate, R, of the yielding or vibrating feed board, having its grating formed of alternate sets of rods, o, and n, in the manner and for the purpose substantially as described.

DESIGN.

1,721.—Pistol Handle.—Daniel Moore, Brooklyn, N. Y. :

EXTENSIONS.

Carding Engine.—Jeptha Dyson, Philadelphia, Pa. Patented Feb. 20, 1849 :

I claim the cylinder, A, surrounded or clothed with a spiral fillet of metal teeth, in form of wire; or with teeth of metal of the form and description mentioned and described in the 4th specification as arranged and employed in the 3d and 4th specifications, in combination with the main cylinder, C, and with the cylinder, B, as with the main cylinder only, to strip and clear the latter by a self-acting contrivance whilst the carding engine is in operation.

I also claim the cylinder, B, in combination with the cylinder, A, and the main cylinder, C, as applied to receive strippings from the former and to deliver them to the latter.

Machinery for Separating Flour from Bran.—Issache Frost & James Monroe, Albion, Mich. Letters Patent dated Feb. 27, 1849. Re-issued March 13, 1855; again re-issued May 11, 1858, and also again re-issued Feb. 25, 1862 :

First, We claim as our invention, the combination of the essential features hereinbefore severally described and severally numbered 1, 2, 3, and 4, or their equivalents, substantially as they are described, and for the purposes specified in the several numbers.

Second, We also claim the combination of the essential features hereinbefore severally described and severally numbered 1, 2, and 5, or their equivalents substantially as they are described; the purpose of the combination being substantially as set forth in number 5.

Third, We also claim the combination of the essential features hereinbefore severally described and severally numbered 1, 2, and 6, or their equivalents, substantially as they are described; the purpose of the combination being substantially as set forth in number 6.

Fourth, We also the combination of the essential features hereinbefore severally described, and severally numbered 1, 2, 6, and 7, or their equivalents substantially as they are described; the purpose of the combination being substantially as set forth.

Fifth, We also claim the combination of the essential features hereinbefore severally described and severally numbered 1, 2, 4, 5, 6, and 7, or their equivalents substantially as specified; the purposes of the combination being substantially as severally set forth.

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IMPORTANT TO INVENTORS.

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THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

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The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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On filing each Caveat	$10
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On application for Re-issue	$30
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On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
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The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

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All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

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Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Notes and Queries

L. K., of N. Y.—In referring to articles which have appeared in the SCIENTIFIC AMERICAN, it would save us much trouble if correspondents would mention the *pages* instead of the dates. Your article is well written, but of no general interest to our class of readers.

C. B. R., of Mass.—Colonel Bissel, who has charge of the engineering operations for cutting the canal to isolate Vicksburgh, is a practical engineer, and is well acquainted with excavating machines. If they can be applied to his purpose, he will, we think, not fail to make the application.

J. F., of Ohio.—The chloride of calcium is made by dissolving marble in muriatic acid, then evaporating the free liquid and fusing the solid product. It is a white crystalline substance, and absorbs water rapidly from the atmosphere. It is employed to dry gases and abstract water from alcohol. It must be kept in a sealed bottle or it will become quite damp.

M. P. H., of N. H.—Molds made of common clay will remain plastic for a considerable length of time after being formed and they may be hardened almost like stone by heat. They require to be dried slowly or they will crack. A little glycerine mixed with clay or with chalk, used for molds, will keep them soft for a long period. By referring to our prospectus in another column you will notice the subscription price of the SCIENTIFIC AMERICAN.

J. S., of Ill.—Glass tubes only are suitable for barometers. They may be of any diameter, provided they are smooth and equal in the size of bore. Crude mercury will not answer for filling them. The method of purifying mercury for barometers is described in most treatises on chemistry. Neither tin, copper or zinc will and swer for the bulbs of thermometers, as the mercury will amalgamate with these metals.

J. B., of Pa.—The way to make a good lubricating oil for clocks and fine machinery is to mix common sweet or sperm oil with its own weight of alcohol in a vial, agitate it occasionally for a few hours, allow it to settle and use the clear. Pure glycerine will not congeal in cold weather, and we think it is the best lubricator you can use.

H. S. R., of C. E.—We cannot give you more information respecting the "photographic camera" than is obtained in the advertisement to which you refer.

S. L. P., of Mich.—The volume of D. Kirkaldy, containing an account of his experiments with iron and steel, is not republished in this country.

R. S., of Mo.—The enamel gloss upon shirt collars and bosoms is the result of practical skill. The linen must be well starched, then a clean iron, hard pressure and friction upon the cloth, will produce the gloss.

W. E., of N. B.—Machinery for scutching and preparing flax for spinning to make cloth, is not manufactured in this vicinity. The best machinery for preparing spinning flax, that we have seen, was made at the works of Sir Peter Fairbairn, Leeds, England. The plant which you have sent us is the common milk-weed. Its fiber is beautiful, but very weak. It may be rendered suitable for some fabrics; a practical test alone can decide such a question.

C. E. K., of Mo.—The principal ingredient in potter's clay is silica. The common kinds consist of about 60 parts of silica, 30 of alumina, 1 of iron and 1 of lime. The iron and lime are impurities. In making pottery the clay is ground, then molded or spun upon a potter's lathe, then carefully dried and afterwards baked in a kiln heated to a very high temperature.

T. R. H., of Mass.—We have seen frictional gearing successfully applied to as small machines as hay-cutters.

R. H., of Md.—Address Mr. F. Storer, chemist, Cambridge, Mass., respecting his experiments with alloys.

O. L., of N. H.—We dont know what kind of sand you use in molding your castings, therefore cannot say whether it is good or not; if the castings are rough, the facing you use is not suitable; fine flour, charcoal and black lead, are used by molders for this purpose. If your patterns don't draw, the draft must be bad, or perhaps there is some glue about them that, by getting damp, causes the sand to adhere. Finely-sifted loam is the best material for molding smooth castings.

F. C. W., of Wis.—Your engine will work up to about 20 horse-power. You will require fifteen square feet of heating surface for every horse-power. If your boiler contains that amount you will have enough. If not, *not*. From the dimensions you have sent us, your boiler appears large enough to drive two such engines as you describe. You say nothing about the pressure you intend to work at, and have, consequently, omitted the most important item of the whole matter.

A. E. T. Jr., of Ohio.—The composition for priming percussion caps consists of fulminating mercury, 3 parts, by weight; chlorate of potash, 5 parts; powdered glass, 1 part. This powder is very dangerous. Another fulminate for percussion caps consists of the chlorate of potash, 6 parts; sulphur, 3 parts; powdered glass, 1 part; charcoal, 1 part. You will find a very full description of the mode of making percussion caps on page 392, Vol. IV (new series) of the SCIENTIFIC AMERICAN.

A. W. B., of N. Y.—Nitric acid is employed to etch steel plates for engraving. Those parts of the plate not to be etched are covered with a varnish made of resin and wax. Mechanical drawing is taught in the Cooper Institute.

C. A. B., of Mass.—A ball fired vertically will descend with the same force with which it was projected, minus that which is absorbed by the resistance of the atmosphere.

E. B., of Mass.—Steel wire is used for clock bells. Apart from the "surroundings" of wire bells in clocks, the wire itself would make miserable music.

A. S., of N. Y.—Hard india-rubber is polished like the fine metals. No oil is used in the polishing operations, as it tends to soften the india-rubber.

W. M. F., of N. J.—On page 384, Vol. VI of the SCIENTIFIC AMERICAN, you will find a description of a projectile on the same principle as yours. We do not think you could obtain any patent on your invention.

S. C., of N. Y.—Fire-clay tiles are manufactured at several works near this city, but we know not where tiles similar to those used in England for malt-kilns are made.

Z. T. W., of R. I.—Your sketch represents a coil of pipe heated by steam placed in a vessel for "trying lard." You inquire if a patent can be obtained for the improvement. This mode of heating boilers by steam is at least half a century old, and is not therefore patentable. Try again.

G. T. C., of Mich.—All our soda ash is imported. You state that the manufacture of this substance may be rendered a profitable business in a salt country, like that where you reside. This depends on the cost of sulphuric acid, which is required in its manufacture. At present soda ash could be manufactured at less cost near the sea-board than in the interior of the country.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 25, to Wednesday March 4, 1863:—

G. S., of Mass.; C. D., of N. Y.. $28; B. & H., of N. Y., $20; J. M Y., of N. Y., $20; T. J. P., of Ohio, $20; A. C. F., of N. Y., $15; J. W. D., of Conn., $44; D. D., of N. Y., $15; J. W. S., of N. Y., $20; G. R., of Ky., $20; A. B. T., of N. Y., $16; E. R., of Ill., $16; E. K. B., of Conn., $25; O. C. S., of Mass., $22; H. B. S., of Ill., $25; G. A. T., of Wis., $26; E. E., of Ill., $25; J. P., Jr., of Cal., $50; W. J. S., of Ohio, $15; M. & B., of Ohio, $15; T. I. E., of Ind., $20; A. B., of N. Y., $30; F. W. R., of N. Y., $12; H. C., of Ohio, $20; K. P. K., of Vt., $20; H. M., of N. Y., $15; E. S., of N. Y., $20; T. & N., of N.Y., $30; J. E. T., of Pa., $44; J. H. V., of Mass., $20; H. T., of N. J., $15; A. C., of Vt., $26; J. W., of Mass., $30; C. R. S., of N. H., $25; G. J., of N.Y., $16; J. B., of Ill., $16; P. L., of N.J., $16; J. C. K., of Mass., $25; A. T. W., of Ind., $25; M. B. W., of Conn., $16; L. G. K., of Conn., $25; B. D. S., of N. Y., $16; R. G., of N. Y., $26; W. W., of N. J., $20; P. M., of Germany, $20; G. B. R., of Mich., $65; L. D., of N. Y., $15; P. R., of N. Y., $20; H. & D., of N. Y., $16; W. & L., of N. Y., $141; N. F. B., of Pa., $30; A. W., of La., $10; J. D. B., of Vt., $20; J.B.S., of Conn., $16; J.H.R., of Mich., $15; C.H.G., of C.E., $25; T. H. A., of Ill., $44; J. I. C., of Wis., $15; C. A., of Cal., $50; J. A. G., of Iowa, $16; J. W. B., of Ill., $15; W. K. M., of Wis., $16; M. D. H., of N. Y., $25; S. and P., of N. Y., $25; H. B. M., of N. Y., $12: W. W., of Cal., $20; J. B., of Ind., $25; J. H., of Ill., $16; J. B., of Ill., $30; H. K. H., of N. J., $16; L. M. Van S., of N. J., $16; J. H. F., of Mass., $25; C. O., of N. Y., $16; N. P. B., of N. Y., $16; R. P., of Wis, $16; R. B., of Pa., $15; S. M. S., of Iowa $25; W. B. A., of Ohio, $25; J. H., of Ohio, 25; R. G., of Ind., $25; H. B. of Iowa, $25; J. N. N., of Iowa, $20; J. T., of Wis., $16; R. W. S., of Mass., $16; J.B., of Iowa, $30; G. H., of Mass., $16; C. A. W., of N.Y., $25; J. H., of Cal., $25; D. G. H., of Mass., $36.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, February 25, to Wednesday, March 4, 1863:—

G. S., of Mass.: A. B., of N. Y.; R. G., of N.Y.; C. D., of N. Y.; F. W. R., of N. Y.; J. W. D., of Conn.; J. E. T., of Pa.; J. H., of Cal.; J. W., of Mass.; E. K. B., of Conn.; C. H. G., of C. E.; S. C. K., of Mass; A. T. W., of Ind.; L. G. K., of Conn.; H. B., of Iowa; J. H., of Ohio; R. G. of Ind.; W. B. A., of Ohio; W. W., of Cal.; J. M. S., of Iowa; S. and P., of N. Y.; J. H. F., of Mass.; W. W. W., of Conn.: M. D. H., of N. Y.; J. B., of Ind.; C. A. W., of N. J; C. R. S., of N. H.; H. B. M., of N. Y.

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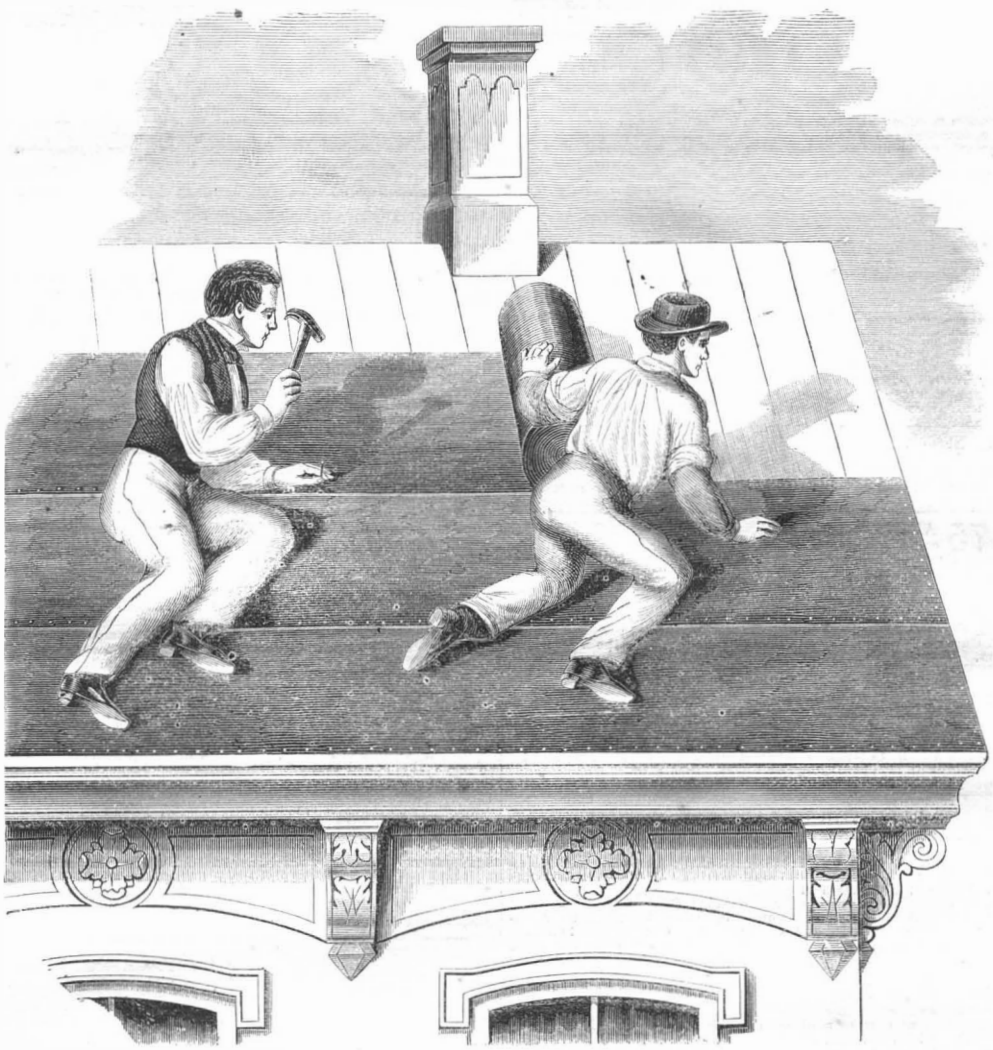
A New Roofing Material.

The accompanying engraving represents the mode of applying a new patented material to the roofs of buildings. The article is manufactured in webs, ready to be laid upon the roof and put on in strips, slightly overlapping one another, and then tacked at the edges as shown by the cut. This brief decription fully explains the mode of applying the material. We will now proceed to state how the article is manufactured, and the nature and advantages of the composition. The base is composed of a thick woven fabric, which is thoroughly saturated and coated with a waterproof durable composition, and then dried at an elevated temperature. The fiber employed is derived from tarred rope, which is made into strong heavy brown cloth by a method for which a patent was obtained through the Scientific American Agency on Aug. 16, 1862. The chief object of the invention is the production of a heavy fabric of great thickness and low cost, which is woven in looms adapted for the purpose, making webs twenty-five yards in length and forty inches in width. To give it the waterproof composition, a web of this fabric is first run by machinery through a vessel containing a composition of warm distilled bitumen, linseed oil, and some other ingredients. This saturates it completely and fills up all the pores. From the bitumen in this vessel it is carried upon rollers to the drying-room, where it is submitted to a temperature of 175 degrees, and is then completely dried, forming the first coat. After this it is again run through a composition of warm distilled bitumen containing a certain quantity of dry pulverized earthy substances; thence it is carried along upon rollers and its surface coated with sand, after which it is callendered and dried again as before stated, when it is finished and put up in rolls, ready to be put upon a roof in the manner shown by the engraving. The fabric is pliable and does not crack, and yet the composition is very hard on the surface, and it is said will not soften in the hottest climate. Such roofing may be walked upon without the slightest injury to it. The creosote in the distilled bitumen is a most effective preservation of the fabric. Duck prepared with the same composition has been known to endure for seventeen years without apparent signs of decay. The greatest difficulty heretofore experienced in roofing of this kind, has been owing to the inferior quality of the fabric used, cotton sheeting being the material usually employed. The fabric used by Mr. Robinson absorbs a large quantity of the insoluble composition, filling up its interstices, and forming a close, thick, firm waterproof material. The drying of this composition under a high heat admirably adapts it for warm climates. Twenty-five miles of this roofing have been manufactured for covering buildings for the Government. Any farmer or mechanic can roof his own buildings with such a material as well as a builder. For more information apply to the patentee, A. Robinson, Secretary of the Ready Roofing Company, 73 Maiden Lane, New York.



ROBINSON'S MODE OF COVERING ROOFS.

An Ingenious Infernal Machine.

North Adams, Mass., was thrown into a fever of excitement last Thursday night, by the arrival of C. P. Bradley, the noted detective of Chicago, and two assistants, having a requisition from the Governor of Illinois for the arrest of Nehemiah Hodge. Hodge was charged with sending an "infernal machine," last December, to one Stephen M. Whipple of Chicago. Whipple formerly acted as agent for Hodge in selling a patent railroad brake of his invention, but of late there have been differences between them and several lawsuits, two of which are now pending. Upon the receipt of the box at Chicago, Whipple suspected that something was wrong from its appearance, and it was placed in the hands of detective Bradley. It was opened by a weight and a wedge, between two ledges of rocks, a long rope being attached to the weight. An explosion followed which could be heard for miles. The box proved to have contained about fifteen pounds of powder. On the inside of the cover a spiral spring had been so arranged as to release a hammer and strike a percussion cap at the moment the box was opened. There was no possibility of a failure in the murderous engine if an attempt had been made to open itin the usual manner. Chief Bradley procured all the evidence that he could obtain, and returned to Chicago, whereupon the United States grand jury found bills of indictment against Nehemiah Hodge of North Adams, for conspiracy and assault, with intent to commit murder, and he was arrested as stated.—*Boston Traveler.*

A NEW rule in fashionable etiquette is now coming into observation in Paris, in consequence of a regulation made by the Empress for a grand masked ball soon to be given at the Tuilleries, viz: that each person must present to the chamberlain, upon entering, a *carte-de-visite* representing the guest in the costume to be worn for the evening. These cards are afterwards to be gathered in a photographic album for the boudoir table of the Empress.

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